STUDIES ON RESEARCHES IN SCHOOL EFFECTIVENESS AT PRIMARY STAGE

International Perspective

A Compendium of Studies Presented at the International Seminar on Researches in School Effectiveness at Primary Stage organised by the NCERT in New Delhi from 14 to 16 July 1999 under the aegis of the District Primary Education Programme of the Government of India

राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
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Foreword

The present volume is a compendium of research papers presented during the Fifth International Seminar on Researches in School Effectivenes at Primary Stage held from 14 to 16 July 1999 at Vigyan Bhawan, New Delhi. The aim of the seminar was to draw on the expertise from researches conducted at the primary stage of schooling under different socio-cultural contexts in India and abroad. It is encouraging that educational researchers have started undertaking studies on issues and problems of primary education in the context of universalisation of primary education.

I wish to express my deep appreciation for the support provided by the DPEP Bureau of the Ministry of Human Resource Development (MHRD) that enabled us to organise and conduct the seminar successfully. The enthusiastic support of the international funding agencies, specially the UNICEF and the European Commission, also deserve appreciation for sponsoring the participation of the overseas participants.

I want to compliment Prof. Ved Prakash and his colleagues, Dr S.K.S. Gautam and Dr I.K. Bansal of the DPEP Core Resource Group who have processed all the research papers and have brought them to their present shape. Those who helped the Core Group in the organisation of the seminar and in providing secretarial assistance also deserve my appreciation. This effort will enable us to disseminate the research findings amongst fellow researchers and practitioners. It is hoped that the present document will benefit researchers and teachers alike.

New Delhi
February 2000

J.S. Rajput
Director
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Introduction

The educational scenario at the primary stage in India still encounters a large number of single-teacher schools, crowded classrooms, a large number of out-of-school and hard-to-reach children, low levels of achievement and lack of infrastructure. Keeping these issues in view, a number of intervention programmes have been anchored by the state from time to time to bring about qualitative improvement in school education at primary stage However, the results are not commensurate with the expectations of the state. The goal of universalising primary education still remains a distant dream. The Union Government in the recent past accelerated the pace of universalisation of primary education through a district-specific programme, namely the District Primary Education Programme (DPEP). The DPEP follows a multipronged strategy that includes research based interventions. In order to give greater thrust to research in primary education, the NCERT has been organising international research seminars since 1995. The Fifth International Seminar on Researches in School Effectiveness at Primary Stage was held from 14 to 16 July 1999 The focus of the seminar was on researches particularly dealing with the effect of intervention strategies for school effectiveness at primary stage The seminar received an overwhelming response from both Indian and foreign researchers. The key findings and implications of the studies presented were discussed during the seminar

It was decided that selected studies presented in the seminar might be published for wider dissemination and for all those Indian and foreign beneficiaries who could not attend the seminar.

This compendium of studies, include the studies presented by the authors during the seminar. The studies have been classified under eight themes. These include : (1) Presentation of Commissioned Studies, (2) Inventive Proposition for School Effectiveness, (3) Improving the Teaching-Learning Process,

(4) Innovative Practices for Teacher Empowerment, (5) Classroom Climate and School Effectiveness, (6) Developing Mathematical Skills, (7) Catering to Children with Special Needs and (8) Managing Multigrade Teaching.

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SECTION I

Commissioned Studies

The studies commissioned by the DPEP Bureau, MHRD, New Delhi discussed in this section include.

- Access and Retention in DPEP : A National Overview
- Internal Efficiency of Primary Education in Phase-I DPEP Districts
- An Appraisal of Students' Achievement during Mid-Term Assessment Survey under DPEP
- Problems and Prospects of Double Shift Schools: A Study of Assam and Madhya Pradesh
- Para-Teachers : Their Role, Problems and Prospects
- Opportunity Time for School Learning in DPEP Districts

1

Access and Retention Under DPEP : A National Overview

Yash Aggarwal

The study was carried out to compare the enrolment trend between DPEP and non-DPEP districts and develop profiles of DPEP in terms of growth of enrolment, repetition rate for each class and gender, and caste based differential in enrolment. The results were based on data collected from 42 districts of seven DPEP States. The findings of the study revealed a consistent pattern of positive gains in enrolment and retention of children. The study concluded that efforts made to improve access in DPEP districts have been successful.

The Context

Due to historical reasons, India is characterised by the persistence of regional and social disparities in general and those of educational development in particular. It is a country of contrasts as there are areas/groups of population that attained universal literacy long ago, while others are still striving to cross even the single digit threshold. The World Conference on Education for All reiterated the need for providing basic education to all children. The conference appropriately highlighted the need for improving the quality of learning outcomes. Thus, the goal of universalisation was not only related to universal access and retention but also included achievement of the identified competencies by all children India is also committed to reduction of disparities and achieving universal literacy and primary education. To fulfil these objectives, a decentralised and

participatory approach to the planning and management of education has been identified as an essential prerequisite Although the emphasis of educational planning during the last fifty years was on removing the supply constraints, little could be accomplished in terms of quality improvement. It is in this context that the DPEP was initiated in seven States covering 42 districts, mostly educationally backward. The programme has expanded over the years and now covers 16 States and nearly 200 districts The DPEP strategy was drawn in tune with the national objectives of universal access, retention and achievement of minimum levels of educational attainment with the focus on girls and children belonging to socially deprived and economically backward sections of the society.

Besides the achievement of the quantitative and qualitative targets within the stipulated period, the major thrust of the DPEP is to promote decentralised management with the active involvement of stakeholders that will have a considerable impact on the sustainability of the project beyond its life cycle The cascading effect of many processes like community participation and revision of curriculum, improvements in classroom teaching-learning practices and in-service training package for primary school teachers, in the long term, will have a positive effect on retention and quality improvement of the system of primary education. An educational management information system was also established in DPEP districts to provide feedback on a number of key performance indicators relating to school systems, fund flows and their utilisation, and monitoring of project achievements in terms of physical and financial targets.

Access and Retention : Some Issues

Universal access to schooling facilities either within the habitation or at a reasonable walking distance is one of the important prerequisites for achieving the goal of universal primary education. However, this may not be a sufficient condition, as the existence or the availability of the educational facility does not imply that it will be used or is useable with optimal efficiency. The questions regarding the capacity, deployment of teaching and provision of other inputs commensurate with the demand are equally important concerns for achieving the desired results.

With increasing emphasis on quality of education, it is also necessary that school conditions be such that all children acquire access to education of a comparable quality irrespective of their location, caste and gender considerations. While it may be true that 98.5% of the population is served by a school within the walking distance of 1 km, the same is not true of the quality of school infrastructure, availability of teachers, teaching-learning conditions and achievement levels of the learners. The educationally backward districts/areas suffer more on account of the latter than the former

Important performance indicators like intake rate, GER and NER, proportion of underage and overage children in primary classes that can further be disaggregated by the gender, social and regional characteristics, capture some important aspects of access. It is often observed that a large number of children stay away from primary schools due to social and economic factors. The problem of working children is well known. The strategies like Double Shift schools, Evening schools, Non-Formal Education Centres and Alternative Schools are aimed at overcoming many constraints in access to education. In order to promote girls' education, the States provide incentives for enrolment and retention. The provision of free textbooks, uniforms, meals, scholarships and day care centres reduce the direct and indirect cost of education and enable the poor and socially backward families to send their children to school. The learning outcomes as measured through achievement tests conducted on Class I and Class III/IV students show large variations not only across the districts but also within the districts. These studies have also shown that considerable efforts are required to enhance learning among primary school children. The development of competency-based instructional materials and textbook revision based on the identified competencies are some of the initiatives taken under the DPEP. While some of these efforts will have immediate impact, the effect of others will only be felt in the long term.

It is also observed that of all the children who enter Class I only 64% reach Class V. It is also estimated that the loss is maximum between Class I and Class II. The higher the drop-out rate, the greater is the wastage and inefficiency of the system. Therefore, the State governments formulated no-detention policies, whereby the children are not detained for the first few years of schooling

on grounds of academic performance. Despite the no-detention policy, the repeaters and drop-out rates continue to be high. The present paper examines various dimensions of access and retention in primary classes especially in the context of the DPEP. More specifically, the following issues were examined:

- To compare enrolment trends between DPEP and non-DPEP districts.
- To examine the profile of DPEP-I districts in terms of:
  - — Growth of enrolment by grades, gender, SC and ST
  - — Repetition rate for each class and by gender
  - — Gender and caste-based differentials in enrolment rate (GER and NER)
- To examine the implications of the recent trends in enrolment and associated indicators for policy, planning and monitoring of primary education in general and that of DPEP in particular.

The study was confined to the districts covered under DPEP-I, and 1993-94 was selected as a base year with 1996-97 as the terminal year for comparative analysis of enrolment indicators for DPEP and non-DPEP districts. A detailed analysis of enrolment in terms of gender, social and regional stratification was also undertaken for the DPEP districts for the years 1995-96 to 1997-98

Sources of Data and Framework of Analysis

The educational structure varies within the DPEP States. The States of Assam, Kerala, Maharashtra and Karnataka follow a primary cycle of four years, whereas Haryana, Madhya Pradesh and Tamil Nadu have a primary cycle of five years. Whenever necessary, the data was adjusted according to the length of the cycle of primary education in the respective States. As mentioned above, the study used secondary data obtained from a number of sources. The main sources of data for the present study were:

DPEP: A specially designed software for computerisation of educational statistics was developed at NIEPA and implemented in all the DPEP districts. School level data on

enrolment by class, gender and caste; on teachers and schools on repeaters by class and transition rate; and on age-grade matrix by gender and caste group for 1995-96, 1996-97 and 1997-98 was analysed for all the districts covered under DPEP.

DPI: In order to undertake the comparative analysis of recent trends in DPEP and non-DPEP districts, data was obtained for all the districts of the seven DPEP States from the office of the Director of Public Instruction (DPI) Directorate of Education of the respective States The data was used for the years 1993-94 to 1996-97.

Census of India: The district level data on age-specific population (6-9 or 6-10 years, as the case may be) is generally not available with the State Directorates of Education/State Project Directors of DPEP In order to make an assessment of the trends in the GER and NER, the district-level aggregated data on age-specific population for 1991 was obtained from the Registrar General of India's Office. The same was used for projecting the age-specific population in the DPEP districts for the years 1995 and 1996. The population estimates derived by the Expert Committee on population projections were also used. Some States have also developed district estimates of 6-9/10 years age group population.

Framework of Analysis

Besides descriptive statistics, the following indices were developed to sharply focus on equity issues

Index of Gender Equity was calculated as follows.

$$\text{Index of Gender Equity (IGE)} = 100 \times \frac{\text{Share of girls in enrolment (I-IV/V)}}{\text{Share of girls in population (6-9/10)}}$$

The above ratio adjusts the change in sex ratio in relation to the enrolment. A value of 100 for the index reflects a complete absence of gender-based inequities However, for the purpose of the present study, a value of IGE above 95 is considered as near-absence of gender-based inequities. It may be noted that IGE

reflects the level of inequities and does not tell anything about the achievement of universal access or retention.

The share of SC and ST students to total enrolment does not convey much except when it is compared with their corresponding share in the population. Therefore, an index of social equity was calculated in the following manner:

$$\text{Index of Social Equity (ISE)} = 100 \times \frac{\text{Share of SC in total enrolment (I-IV/V)}}{\text{Share of SC population in total population}}$$

Similarly, the Index of Social Equity can be worked out for the participation of STs in primary education

The cohort and students flow analysis provides an accurate estimate of the internal efficiency of an educational system However, in India, data is generally not collected on school cohorts and consequently crude estimates of drop-out and repetition rates are obtained by considering the grade-to-grade enrolment transition In certain cases, this can lead to erroneous results/findings/conclusions. The problems become more serious when the students move from one system to another. For example, a statistically significant proportion of lateral movement of the students from private unrecognised schools to government/recognised schools or vice versa has also been reported in a study conducted by the DPEP Bureau. Large scale migration from/to smaller States/UTs and late entry in various grades will further distort the structure of the enrolment pyramid. These types of factors can introduce considerable margin of error in the estimation of drop-out and repetition rates following the traditional method of calculation of these indicators based on the aggregated data.

In the present study, the grade to grade transition rates were calculated using the ratio of enrolment in grade (g+1) at time (t+1) to enrolment in grade (g) at time (t).These ratios also suffer from the inadequacies mentioned above and in the absence of any estimates, it is not possible to isolate the effect of lateral entry, drop-out rate and other factors affecting the flow of students over time and grades. The drop-out rates have thus not been reported in the study.

Improved Quality of Infrastructure and Additional School Places

As a part of DPEP, a number of initiatives were taken to improve access to and the quality and coverage of schooling facilities. These include:

- Construction of new school buildings out of DPEP funds as well as through the efforts of the State government.
- Rehabilitation of the dilapidated facilities through reconstruction and repairs to the existing classrooms.
- Provision of additional classrooms in areas of overcrowding or where the facilities were insufficient.
- Provision of hand pumps for safe drinking-water, construction of boundary walls and toilets.

Since the inception of DPEP, 6,165 new schools were constructed and an additional 6,859 classrooms were built up to December 1998 About 10,000 schools and 7,000 classrooms were under construction. When completed these will improve the quality of infrastructure and provide many additional school places. Similarly, the improvements in quality of infrastrucre through the construction of additional toilets, provision of water facility and construction of boundary walls have improved the school environment. These measures, along with improved classroom interaction will have a positive impact not only on access but will also lead to improved retention in the long run, especially among the girl students. It is important to observe that the civil works programme is coming to a close in most of the DPEP phase I districts. While there is an overall ceiling of 24 per cent for the civil works component, it was not sufficient to meet the requirements of infrastructure rehabilitation in some of the educationally backward districts Additional funds for improving the infrastructure facilities will have to be mobilised from other sources on a long-term basis.

Enrolment Trends at All India Level

Over the years there has been considerable increase in the number of children enrolled in various grades of primary education There were 110 million children enrolled in primary

classes in India in 1996-97. The trend analysis of primary stage enrolment in India shows a declining growth rate. Nationally, the primary classes enrolment increased by 5% during the seventies and by 2.65% per annum during the eighties. The growth rate further declined to 0.67% between 1993-94 and 1996-97 (Table 1). The decline is not only confined to boys' enrolment, but is equally serious for girl's enrolment, which declined from 9.3% in the sixties to as low as 1% in the last three years.

TABLE 1

Annual Compound Growth Rate of Enrolment at Primary Stage: India

Period	*Boys*	*Girls*	*Total*
1950-51 to 1960-61	5.51	7.76	6.19
1960-61 to 1970-71	6.53	9.33	7.46
1970-71 to 1980-81	4.23	6.45	5.00
1980-81 to 1990-91	2.35	3.17	2.65
1990-91 to 1996-97	1.51	2.81	2.06
1993-94 to 1996-97	0.38	1.07	0.67

Source: Selected Educational Statistics, 1996-97, MHRD

The long-term decline in the growth rate of enrolment requires serious introspection. This is particularly happening at a time when more than one-third of the children admitted to Class I fail to reach Class V. It may be observed that some States like Kerala and Goa have shown a real decline in the number of eligible children due to declining birth rates. Similar trends are also observed in the State of Tamil Nadu in the recent years. Therefore, the growth rate of enrolment may even be negative in some of these areas. However, there are large areas which are still experiencing a high population growth and have a low intake rate, and the number of out-of-school children is large. These areas should have recorded a much higher growth rate of enrolment. Moreover, such districts are much larger in number than the districts where saturation in terms of access may have been nearly universalised. The period of stagnating enrolment also coincides with the phase of structural adjustment and

opening up of the Indian economy It is also a fact that despite economic constraints, the allocation of financial resources for education in general and for elementary education in particular has been stepped up considerably in the recent years. Is it that the poor and socially deprived families are in relatively too worse a condition to afford the education of their children? Have we already reached the hard bottom, and is additional enrolment beyond this threshold difficult? Do we need to search for alternative modes of improving access so that the out-of-school children can be brought to the fold of education? Can we afford stagnation in enrolment when only a few States have actually achieved or are within the realm of achieving universal access to primary education? It is in this background of a rapidly declining growth rate of enrolment that the progress in DPEP districts has shown a significant increase in enrolment It is thus evident that there is a need to develop a more responsive system through a mission-mode strategy to bring the out-of-school children to the fold of education by following non-conventional methods. The non-DPEP districts could follow some of the innovative methods of improving access developed in the DPEP districts.

Enrolment Trends in DPEP and Non-DPEP Districts

The 42 DPEP districts are spread across seven States. With the exception of Madhya Pradesh, 3-5 districts are covered are in each of the other States this number forms; a small proportion of the districts in each State It is true that the DPEP districts are educationally backward but so are many other districts in the selected States. Therefore, a comparison of the enrolment trends in DPEP and non-DPEP districts will give an idea about the progress in one group of districts as compared to that in others provided the impact of other interventions remains the same Since the EMIS under DPEP is confined to DPEP districts only, the comparable data for non-DPEP districts was not available from DISE. In order to ensure comparability of the enrolment data, the educational data collected by the Directorate of Education in each State was used for comparing DPEP districts with non-DPEP districts.

Based on the data obtained from each State, the percentage increase in enrolment in 1996-97 over the base year of 1993-94

was calculated for the following groups of districts for each state covered under DPEP:

- DPEP Districts
- Non-DPEP Districts

The following findings are based on the assumption that 1993-94 was a normal year as far as primary education was concerned. It is also assumed that the data provided by the DPI was collected through the normal process of data collection and there were no data gaps between the DPEP and non-DPEP districts. Other things being equal, the difference between the two sets of districts was that the former received DPEP inputs in addition to the normal funding and the latter was without DPEP inputs but received the usual departmental inputs.

1. Four of the seven DPEP States, i.e., Haryana, Assam and Maharashtra, showed a relatively higher enrolment increase in DPEP districts as compared to non-DPEP districts. The differential between the two was from 7.5 to 16.8 percentage points. There was no increase in enrolment in non-DPEP districts in Haryana.

TABLE 2

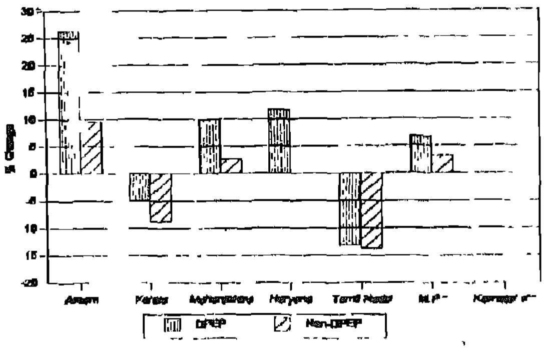
Per Cent Increase/Decrease in Enrolment, 1993-94 to 1996-97

State	*DPEP (% increase/decrease)*	*NOn DPEP (% increase/decrease)*	*Difference (DPEP Non DPEP) in percentage points*
Assam	26.3	9.5	16.8
Kerala	-4.9	-8.8	-3.9
Maharashtra*	10.1	2.6	7.5
Haryana	11.8	0.1	11.7
Tamil Nadu	13.3	13.7	0.4
Madhya Pradesh*	6.8	3.1	3.7

Notes. * Pertains to terminal year data for 1995-96 and not 1996-97

2. Kerala experienced a constant decline in the enrolment for the last ten years or so and this phenomenon is

continuing, both for the DPEP and non-DPEP districts. However, the decline in enrolment in DPEP districts is less as compared to the non-DPEP districts by 3.9 percentage points.



Data for Tamil Nadu was adjusted by DPI by removing long-term absentees

*** Data for Madhya Pradesh and Maharashtra up to 1995-96.**

**** Karnataka data shows large variations in year to year enrolment.**

3. The demographic structure and trends in population growth in Tamil Nadu also follow a trajectory similar to that of Kerala. The population projections for the 6-10 age-group are reported to follow a declining trend. The analysis indicated that the increase in enrolment in DPEP districts in Tamil Nadu was practically the same as that is non-DPEP districts (difference 0 4 percentage points). A major problem in the analysis of DPI data for Tamil Nadu was encountered as the State has revised its enrolment statistics by eliminating the long-term absentees. This adjustment resulted in a steep decline of about 18% in the over-all enrolment in 1996-97 as compared to 1995-96.

The above analysis therefore shows that in the initial years, the enrolment in DPEP districts increased rapidly and at a pace much higher than the corresponding increase in the non-DPEP districts.

Primary School Infrastructure : Student Classroom Ratio (SCR)

SCR is an important indicator of the availability of classrooms in primary schools. The experience of various development projects shows that as a result of increased enrolment, the demand for school places increases and often leads to overcrowding of classrooms and consequent lack of interest among students and teachers. Therefore, it is essential to increase the classroom space in relation to increased enrolment so that the school environment remains attractive to the children who attend school for the first time. Since DPEP was viewed as an effort to improve access and retention in educationally backward districts, it was rightly decided to launch a comprehensive programme for additional capacity creation through opening new schools and construction of additional classrooms in the first few years of the project's implementation. This strategy has proved to be successful as the increased availability of classrooms has generally kept pace with the increased enrolment in DPEP districts at the macro level. This is evident from the fact that at the national level, the average SCR has either remained almost slight or a little decline has been observed. A sharp decline would have indicated an excess supply of school places and a sharp increase would have shown the opposite. A more detailed analysis at the cluster level needs to be undertaken to identify imbalances in the demand and supply of classrooms. There are large inter-State and inter-district variations in SCR.

TABLE 3

Student Classroom Ratio by States

State	*1995-96*	*1996-97*	*1997-98*
Assam	82 7	83.8	78 7
Haryana	50.3	49.1	47.9
Karnataka	33.1	30.0	32.9
Kerala	30.9	31.2	31.2
Madhya Pradesh	40.7	40 8	38.8
Maharashtra	46.0	47.1	49.2
Tamil Nadu	46 4	43.7	41.7
All India	41 5	41.2	41.0

Source: Computed from DISE data

While, under the scheme of Operation Blackboard (OB), each primary school was to be provided with a minimum of two all-weather classrooms, still there are many schools where only one classroom is available for instructional purposes. Either the other classroom has not been constructed or is not available for instructional purposes. Generally, one classroom for 40-50 children is justified. But when this ratio is higher than 50-55, it shows the inadequacy of classroom space for instructional purposes. The problem of the availability of instructional rooms seems to be more serious in Assam *The Sixth All India Educational Survey* data for Assam showed that in 1993-94, nearly 20% of the schools were without even a single instructional room. Thus, the overall SCR will tend to rise substantially. The recent efforts to provincialise primary schools will further aggravate the problems of classrooms for instructional purposes as most of the 'venture' schools are without adequate infrastructure facilities.

On the other extreme is the case of Kerala, where the average SCR was 31 in 1997. This is a relatively low value for the densely populated settlements having large schools. The shrinking population base and relatively better availability of classrooms is a major reason for the low SCR in Kerala. Therefore, many additional schools may not be required to be established in Kerala; the effective utilisation of instructional rooms could be an issue, especially in areas where the enrolment decline is significant. A more detailed analysis at cluster level may help in identification of the schools where there are imbalances in the SCR. A review of the civil works programme under DPEP indicates that repair and maintenance of classrooms needs to be given more attention. The regular upkeep of the classrooms is essential to ensure that all classrooms can be effectively used for instructional purposes for the whole duration of their life. Regular maintenance of the school buildings either through the school contingency funds or from the support of the community will go a long way in ensuring the availability of classrooms for their life period The DISE data can be used at the district and the cluster level to identify the schools where the need for rehabilitation of classrooms is the most.

Enrolment Trends

DPEP aims to improve access to primary education through formal and non-formal modes of education. The DPEP strategy involves opening of new primary schools in unserved; areas, NFE centres to enrol out-of-school children, alternative schools and other type of facilities in smaller and unserved habitations. The project also provides for additional teachers.

Aggregate analysis for all 42 districts indicates that between 1995-96 and 1997-98, the net enrolment increase was 1.35 million of which 0.578 million additional children were enrolled during 1997-98 alone. Expressed in terms of per cent change, the increase was 9.43 % during 1995-96 and 1997-98. Nearly two-third increase during 1996-97 and 1997-98 and 6.48% during 1996-97 and 1997-98 is attributed to the success of Alternative Schools (AS) and an innovative Education Guarantee Scheme launched in Madhya Pradesh (EGS) The increased coverage through AS/EGS also shows the potential of extending access through innovative strategies, especially in the case of underdeveloped regions. The following table shows the comparative change in enrolment for the DPEP states

TABLE 4

Enrolment Trends in DPEP Districts
(Formal Primary Schools)

% change enrolment		
State	*95/96 and 96/97*	*96/97 and 97/98*
Assam	35 66	5.90
Haryana	15.90	7.92
Karnataka	5.56	3.40
Kerala	-3.82	-4.47
Madhya Pradesh	10.26	10.50
Maharashtra	14.57	4.86
Tamil Nadu	-1.57	2 63
All India	9.43	6 48

Note: Data for 1997-98 includes enrolment under AS/EGS

The recent decline in growth of enrolment at the primary stage consists of two components. First, the enrolment decline in Kerala is related to the demographic transition. In Kerala, the population size has almost stabilised due to a low birth rate and the number of children in the school-going age-group have shown an absolute decline. Second, group consists of the states like Assam and Maharashtra, which experienced high growth rate in enrolment in the earlier years of DPEP. Since most of the out-of-school children were enrolled, these States did not maintain the same level of additional enrolment in Class I. This phenomenon will produce a temporary peak in enrolment in each class as the students progress from one class to another. In Assam, the increase between 1995 and 1996 was 35.6%, which declined to 5.9% between 1996 and 1997. Third, with a greater push for the alternative modes of education, some shift in enrolment from government primary schools to these schools was also reported. Madhya Pradesh is a typical example where the enrolment increase in formal primary schools between 1995 and 1996 was 10 3%, which declined to 1.1% between 1996 and 1997. However, the increase during the same period was 10.5% if the enrolment in AS/EGS is also included. The State is known for its pioneering efforts in AS/EGS and 3,43,000 children were enrolled under this scheme till September 1997. While the coverage under AS/ EGS is expanding rapidly, its implications for the sustainability of the resource provisions, teacher recruitment, training and deployment should be considered seriously at this stage. Strategies for sustaining educational standards in the AS/EGS schools need to be accorded high priority in the coming years.

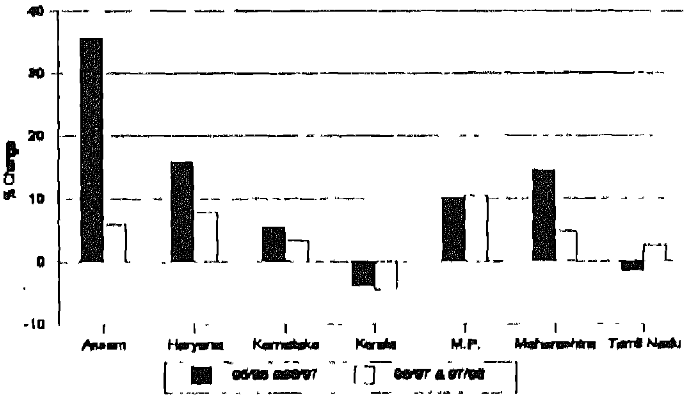
As of now, no systematic database on the EGS/AS schools has been created. In view of the large coverage under the scheme, a regular data base needs to be created so that access and quality related issues can be examined and addressed at the district and the cluster level.

Trends in Class I Enrolment

Formal education is going through a critical phase of.development in DPEP districts. Various innovative models are being experimented with and implemented to provide access to and improve the quality of education. The recent data shows a significant decline in Class I enrolment in some districts. There

Enrolment Changes in DPEP

Districts by States



were 10 districts where more than 5% decline in Class I enrolment, was observed between 1996-97 and 1997-98. These were Dhubri and Morigaon in Assam, Mallapuram in Kerala, and Rewa, Sidhi, Mandsaur, Raisen, Surguja, Bilaspur and Rajnandgaon in Madhya Pradesh. But, when the enrolment in the AS/EGS, wherever, it exists, is added to the formal school enrolment, the increase becomes positive. However, a detailed study is needed to establish the extent of shift that is taking place from formal to AS/EGS. This is more important in Madhya Pradesh due to the large coverage under AS/EGS.

Girls' Enrolment

The share of girls to total enrolment in 42 DPEP districts increased from 45 5% in 1995-96 to 46.3% in 1997-98. The position with respect to girls' enrolment in various grades has

improved in practically in all districts. The Index of Gender Equity was calculated.

A comparative analysis of the IGE for 1995-96 and 1996-97 shows a considerable improvement over the years. For 21 out of a total of 42 districts, conditions of nearly perfect equity have been attained. In another 16 districts, the enrolment distribution indicates that the gap between boys' and girls' participation is not much and is within the realm of attainment of a near absence of inequities. There were five districts, namely, Guna, Tikamgarh, Sidhi, Dhar and Rajgarh where additional efforts are required to reduce the inequities between the enrolment of boys and girls. The data provided by the SPO, Madhya Pradesh on AS/EGS in these districts shows high participation of girls. It is therefore evident that gender-related inequities may be overcome soon even in the most educationally backward districts having large concentration of tribal population by following a strategy of alternative schooling.

TABLE 5

Trends in IGE by districts

Range	*1995*	*1996*	*1997*
<75	1	1	0
75-85	5	4	5
85-95	21	19	16
>95	15	18	21

The minimisation of gender-based inequities in primary enrolment will go a long way in improving the literacy in the DPEP districts, which were largely low female-literacy districts.

While the above analysis suggests the near absence of gender inequities in most of the DPEP districts, it should not be concluded that nothing more needs to be done as far as girls' education is concerned. Participation and retention may still be an issue for girls in areas with low GER and especially in situations where both boys and girls lag behind in participation.

SC and ST Enrolment Trends

As mentioned earlier, most of the DPEP districts were

educationally backward and low female-literacy districts. Some of the DPEP districts had a high concentration of SC and ST population. The literacy among the SC and ST female population was among the lowest in country. The SC and ST population is deprived not only due to social factors but also due to low economic status with low levels of learning. Seven out of 19 districts in Madhya Pradesh had more than 40% of its population belonging to SC and ST categories. These districts are Shahdol, Sidhi, Dhar, Betul, Surguja, Bilaspur and Raigarh.

The analysis of enrolment data for the last three years shows considerable improvement in the coverage and participation of SC and ST children in primary education. The Index of Social Equity was calculated. Ideally, the value of ISE_{sc} will be 100 or close to it. A value of ISE_{sc} greater than 95 is taken to reflect a near absence of social inequities. The lower the value from 100, the greater will be the extent of inequities in participation in primary education based on social factors. The latest enrolment data on SC enrolment shows that for all the districts, the ISE_{sc} was more than 95. This shows that the inequities in the participation pattern of SC and general caste groups are nearly absent. However, the position is different in the case of ST population groups. While the SCs represent a dispersed minority, the distribution of ST population show the characteristics of a concentrated minority. Therefore the SC and ST populations face different types of problems as far as their educational advancement is concerned.

The Index of Social Equity for the STs was also calculated in the manner described above. The Index of Social Equity was calculated for 31 out of 42 districts. Haryana does not have any ST population and therefore all the four districts were excluded from the analysis. The State government of Maharashtra has recently added a few more castes to the category of STs with the result that ST enrolment has shown a steep increase in 1997-98. This has also resulted in problems related to enumerating the students belonging to ST groups in Maharashtra. Moreover, district-wise estimates of the ST population according to the revised list are not available as yet. Therefore, all the five districts of Maharashtra were excluded from the calculation of ISE.

Population data for ST population for two districts in Tamil Nadu was also not available.

Assam and Madhya Pradesh are the two States with a large concentration of tribal population, among the DPEP-I States. The ST enrolment data for 1996-97 was not available for Assam. The analysis for MP for which comparable data for 1996-97 and 1997-98 is available shows that there has been a significant improvement in the ISE_{SC} for all the districts. This was possible as relatively more ST children were brought to the fold of primary education both through the formal as well through AS and EGS schemes.

The following table shows the distribution of ISE for the ST population for 1997-98.

TABLE 6

Distribution of Districts by ISE_{ST}, 1997-98

S.No.	*Range of ISE_{ST}*	*No. of Districts*
1	Less than 75	1
2	75-85	5
3	85-95	5
4	>95	20
	Total	31

The above table shows that there were still some districts with a low ISE_{ST}. This reflects a situation where relatively more children belonging to ST are out of school. The districts with a proportionately low enrolment of ST are Mandsaur, Guna, Shahdol, Dhar, Satna in Madhya Pradesh and Dhubri in Assam. In 1996-97, there were nine districts where ISE_{ST} was less than 90. In 1997-98, the number of such districts was reduced to six. With more concentrated efforts in improving the access and retention of ST children, it is expected that the position in the other districts will also improve for the better.

The above analysis is aggregative in nature. There may be large variations between the schools, clusters and the blocks. It is, therefore, important that the States and districts should initiate efforts for cluster and block level comparative analysis and share

the findings with educational administrators and decision-makers at these levels and take emulative measures as may be necessary.

Internal Efficiency

The low internal efficiency of the educational system has always been an area of concern in many countries. India is no exception. Crude estimates indicate that it requires inputs for about 7.1 years to produce a successful primary school graduate with 5 years of educational attainment. The corresponding value is higher in some of the educationally backward States. However, if the levels of achievement are also taken into account, then the efficiency of the system will reduce further as not all children qualifying Class 5 attain the masterly level of competencies as defined under MLL

The internal efficiency of the school system depends upon two factors, namely, the drop-out rate and the repetition rate. The analysis of repetition rates for 1995-96 and 1996-97 were calculated using the following formula:

$$\text{Repetition rate in grade } g = 100 \leftrightarrow \frac{\text{Enrolment in grade } g \text{ at time } t}{\text{Repeaters in grade } g \text{ at time } (t+1)}$$

The repetition rate was calculated for all classes and for all 42 districts. Overall, there has been a marginal decline in the repetition rate from 8.39% in 1995-96 to 8.29% in 1996-97. Assam continues to have the highest repetition rates even in Class I. This is largely due to admission of underage children who can not be promoted to Class II. The reasons for repetition at Class I need further examination, as most of the States follow a no-detention policy. Under the policy, the students are not to be detained on grounds of poor academic performance.

An effort was also made to examine the drop-out rate based on the DISE data. However, it was found that for many districts, the enrolment in year (t+1) in grade (g+1) was higher than the corresponding enrolment in grade g in year t. This shows a significant amount of lateral entry at grades other than 1. The existence of this phenomenon was reported last year also. Consequently a research study has been taken up by TSG to

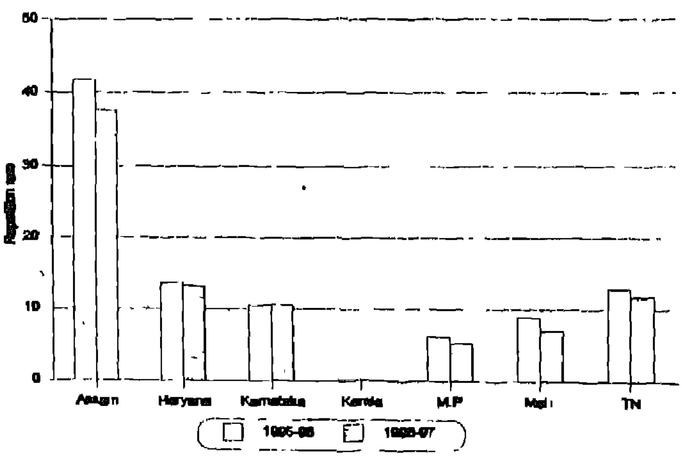
TABLE 7

Repetition Rates

State	*Class I*		*Primary Grade*	
	1995-96	1996-97	1995-96	1996-97
Assam	41.72	37.63	27.76	28.89
Haryana	13.60	13.17	13.58	12.71
Karnataka	10.51	10.56	8.22	9.36
Kerala	0.31	0.21	4.95	4.59
Madhya Pradesh	6.22	5.23	5.78	5.65
Maharashtra	8.89	7.03	7.37	5.99
Tamil Nadu	12.88	11.81	11.05	10.13
All India	10.80	10.66	8.39	8.29

examine the phenomenon of lateral entry in the State of Haryana. It is also suggested that another research study should be undertaken to estimate the drop-out rate by analysis using the true cohort method. The study could be undertaken for a small sample of schools in the selected districts.

Class I Repetition Rate



Gross Enrolment Rate (GER)

GER is an important indicator of participation in education. GER uses age-specific population in the denominator. In the case of primary education, it corresponds to the population in 6-9 or 6-10 years depending upon whether the primary education cycle is of four or five years. The estimates of age-specific population are not available in a consistent manner for all the districts. Moreover, no sound methodology has been established to undertake projection of population in various age-groups at the district level. For the purpose of the present study, we have used the growth-rate method with the 1991 population as the base population. The single-year age distribution was used to estimate the districtwise population in 6-10/6-9 age-group. The GER was calculated for the formal school enrolment.

TABLE 8

GER in DPEP Districts

State	*GER (formal schools)*			*GER Including AS*
	1995-96	1996-97	1997-98	1997-98
Assam	79.1	105.2	108.4	108.4
Haryana	62 4	70.9	75.0	75.0
Karnataka	96.3	99 6	101.0	101 0
Kerala	90.5	97.9	94.2	94.2
Madhya Pradesh	80.1	86.6	85.8	91 0
Maharashtra	95.8	107.6	110.3	110.3
Tamil Nadu	82.5	85 7	85.0	85.0
All India	83.9	91.6	92.0	94.2

The average GER in the DPEP-I States varies from 75% in Haryana to 110.3% for Maharashtra. The average GER for all the DPEP districts was 83.9% in 1995-96, which increased to 91.6% in 1996-97. Because of the increased emphasis on AS strategies, the GER for 1997-98 was 92% for the formal schools and 94.2% for enrolment, including AS enrolment. It may be noted that still a group of the children learning through unrecognised private

schools, non-formal education, night schools, voluntary efforts and other innovative efforts has not been included the above GER. If their number is included, the GER may be somewhat higher than what is projected here. As the DPEP progresses, the enrolment coverage may increase due to various efforts in formal, non-formal, Alternative Schools, EGS and private unrecognised schools. It may be worthwhile to study the share of each of these components in some selected districts on a sample basis.

Table 9 shows the distribution of districts by GER (including AS enrolment). While there were as many as 17 districts for which GER was more than 95%, there were few districts for which GER were less than 75%. These were Sirsa in Haryana and Rewa and Sidhi in Madhya Pradesh.

TABLE 9

Distribution of Districts by GER

State	*<75*	*75-85*	*85-95*	*>95*	*Total*
Assam	-	-	-	3	3
Haryana	1	2	1	-	4
Karnataka	-	-	2	2	4
Kerala	-	-	3	-	3
Madhya Pradesh	2	1	9	7	19
Maharashtra	-	-	-	5	5
Tamil Nadu	-	4	-	-	4
All India	3	7	15	17	42

The above analysis of GER shows that while there have been improvements in enrolment and coverage over the years, there are large numbers of children who may still be out of school. In all probability, these are the children who are living in small habitations where access to school is poor, and those children who are in difficult circumstances. Reaching these children requires innovative strategies like AS/EGS. Additionally, more needs to be done in terms of developing a locally relevant curriculum and training of teachers to handle first-generation learners It will also require still greater interaction between the school and community through frequent meetings of VECs and

by strengthening women's groups and other community-based agencies.

Concluding Observations

The analysis of the data for the period 1995-96 to 1997-98 suggests consistent improvement in enrolment and retention, including that of girls, SC and ST children, and a steady progress towards achievement of DPEP goals in the 42 districts covered under DPEP-I. It is also clear from the above analysis that a variety of innovative and cost-effective strategies will have to be evolved to reach the unreached in isolated and smaller habitations, habitations with a large concentration of ST children and areas having a large concentration of working and disabled children. The traditional strategy of providing formal school everywhere may not be a cost-effective way of improving access in certain areas. In this context, there are lessons to be learnt from the DPEP strategy of alternative models of providing access to children who had so far remained outside the reach of the educational system. This should not mean that the formal schools will be neglected. As far as the formal schools are concerned, efforts should be continued to improve the resource utilisation, increase the internal efficiency to an optimal level and raise the quality of instruction so that the overall goals of DPEP can be realised.

Girls' Participation and retention has improved considerably in the DPEP districts and significant progress has been made to reduce inequities in access and retention between boys and girls. The IGE is more than 95 for 21 of the 42 districts. In other districts, excepting five districts in Madhya Pradesh, the index shows a near absence of inequities and is close to 95. The achievement in girls' enrolment as reflected in IGE is a positive step forward and needs to be sustained

The inequities in participation rates of SC, ST and others in primary education have tended to narrow down over the years. There are some geographical areas where the ST enrolment is below the desired level. The situation is improving as a result of the new innovative strategies like AS/EGS. The geographical pockets with specific problems of enrolment and retention for the ST children should be identified for possible interventions.

The study is confined to district level aggregates. It is necessary to undertake disaggregated analysis at the block and cluster levels so that the regions with specific problems of enrolment and retention could also be identified. It is necessary that target-group oriented and area-specific approaches to educational planning should be strengthened.

While the AS/EGS has shown positive gains, especially for the children living in the smaller habitations, their sustainability needs to be ensured. Students to the extent of about 10% of the formal primary schools in the State of Madhya Pradesh have already been enrolled through AS/EGS. The initial gains have to be sustained and at the same time the quality of instruction has to be maintained so that the goals of MLL are realised. A systematic data base for the AS/EGS also needs to be developed so that key performance indicators could be monitored over time.

The issues related to the quality and reliability of educational statistics collected through DISE are also being addressed. A sample survey has already been initiated in selected districts. The results are expected by the end of 1998 and will provide a first-hand estimate of the reliability of the data being collected through DISE.

Lateral entry has emerged as an issue for further research. A research study has already been initiated in Haryana. The study, when completed, will provide an insight into the magnitude and causes of lateral entry into various grades.

On the whole, the efforts to provide improved access in DPEP districts have succeeded but innovative and cost-effective strategies need to be pursued further so as to cover the marginalized, working children and children with disabilities. The retention is improving in most of the districts but more intensive efforts are required to accelerate the gains in the internal efficiency of the educational system as a whole.

2

Internal Efficiency of Primary Education in Phase-I DPEP Districts

A.B.L. Srivastava

The objective of the study was to find out the extent of wastage in primary education in order to study the effect of drop-out rate and repetition rate on internal efficiency. The study was based on the data collected in 42 districts of DPEP Phase-I States. The findings of the study implied that the DPEP districts have achieved a perceptible success in enhancing access, enrolment and retention and in reducing inequities, specially among girls, SC and ST children. The DPEP districts have also witnessed a reduction in the wastage.

Introduction

The main purpose of studying internal efficiency is to find out the extent of wastage taking place in primary education because of some children dropping out from school prematurely (that is, without completing the full cycle of primary education) or repeating grades (that is, spending more than one year in the same grade). In a system in which all the children admitted in Class I continue their education till the end of the primary cycle without dropping out or repeating any grade, there is absolutely no wastage. Such a system can be regarded as perfect from the point of view of internal efficiency. However, when some children either repeat grades or drop out, the internal efficiency of the system is adversely affected. The measure of internal efficiency takes into account the number of pupil-years wasted due to both

dropping out and grade repetition and compares the same with the ideal situation when there is no such wastage.

The study of internal efficiency also provides information on the flow of students from grade to grade for the cohort entering Class I on the basis of grade-wise promotion, repetition and drop-out rates. Also, such indicators as 'average number of years spent by the children in primary classes' and 'input-output ratio' can be derived from the flow chart.

This paper presents the findings of the study of internal efficiency for the DPEP Phase-I districts, based on the EMIS data on enrolment and repeaters for the years 1996-97 and 1997-98. Actually the study presents the picture for the year 1996-97, since the indicators of wastage are based on the number of those dropping out or repeating grades out of the children enrolled in 1996-97. An assumption that there is no direct entry in grades or Classes other than Class I is implicit in the methodology adopted for this study. Another implicit assumption is that there are no new admissions in Class I after 30 September, which is the date of reference for data collection. Unfortunately this is not always true, as in several places children continue to get admitted in Class I even after 30 September, but their percentage is usually small. The results have to be interpreted keeping these assumptions in mind.

Computation of Repetition and Drop-out Rates

The two important indicators of wastage are repetition rate and drop-out rate, which can be calculated for any class or grade and any year from the class-wise data on repeaters and drop-outs. The repetition rate for Class I and year t is defined as:

$$RR(1, t) = \frac{\text{Number of repeaters in Class I in year } t+1}{\text{Enrolment in Class I in year } t}$$

The number of children who drop-out from a given grade is obtained by subtracting from the total enrolment of that grade in a given year, the number of those who got promoted to the next grade as well as the number of those who repeated the

same grade in the following year. Thus, the drop-out rate for Class I in year t is:

$$DR\ (i,\ t) = \frac{E(i,t) - R(i,\ t+1) - P\ (i+1,\ t+1)}{E\ (i,\ t)}$$

where E (i, t) = Enrolment in Class I in year t

R (i, t +1) = Number of repeaters in Class I in year t+1

P (i +1, t+1) = Number of promotees in Class i + 1 in year t+1 (i.e the number of those promoted from Class i of year t to Class i+1 of year t+1).

The repetition and drop-out rates are usually expressed in the form of percentage.

In some of the districts, the drop-out rates in certain classes were found to be negative, mainly due to the following reasons.

1. *Lateral Entry in Classes Other Than Class I* : Some children take admission directly in Classes II, III, IV or V. Such children have either studied at home or in an unrecognised private school before seeking entry in a government or recognised private school.

2. *Late Admissions in Class I* : Schools continue to admit children in Class I even after 30 September. As a result, some children of Class I, admitted after this date and hence not enumerated in 1996-97, were included among the promotees or repeaters in the following year, 1997-98.

To obviate the difficulty in analysis of data arising from negative drop-out rates, it has been assumed that the drop-out rates in all such cases are 0.005 or 0.5%.

Another point to be noted is that in our analysis the graduation rate or promotion rate for the last Class (IV or V as the case may be) of the primary cycle is actually the proportion of students in this grade who do not repeat In the absence of data on the number of graduates, it has been assumed that all the students who reach the last grade eventually become graduates, some among them after having repeated the grade for one or more

years. In effect, it means the drop-out rate in the last grade is zero.

Student Flow Chart

If the cohort of children who are admitted in Class I in any year are followed up for the next few years, it will be observed that: (a) some would be getting promoted from one grade to the next till they complete the full cycle of primary education successfully without repeating any grade, (b) some would eventually complete the full cycle of primary education after repeating one or more grades and thus, taking more than the minimum 4 or 5 years required for the purpose, and (c) others would be dropping out from school before completing the primary education cycle If we start with a hypothetical cohort of 1000 Class I pupils, and if the repetition and drop-out rates of the year 1996-97 hold good, then we can draw a flow chart for this cohort. The chart would show how many from this cohort drop out or repeat grades each year and how many eventually complete the full primary cycle, either in the minimum 4/5 years or in more years than that because of repetition. The method of deriving internal efficiency indicators in this way is known as the Reconstructed Cohort Method. The main assumptions made in these flow charts are: (1) the repetition and drop-out rates of 1996-97 hold good for the cohort, and (2) no child repeats any grade for more than 3 years. Chart I shows the flow chart for Sirsa, a district of Haryana, based on the repetition and drop-out rates of 1996-97.

Computation of Input-Output Ratio and Other Indicators of Internal Efficiency

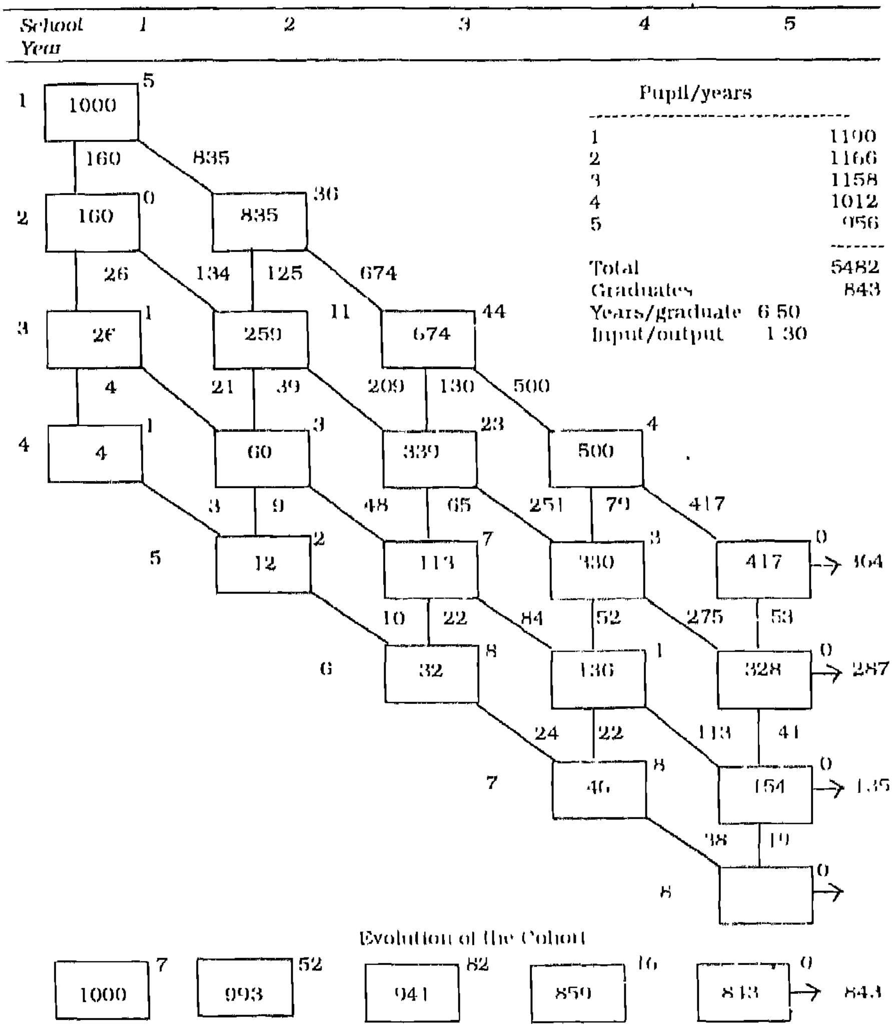
Input-Output Ratio and Coefficient of Efficiency

In a 5-grade cycle of primary education, if all the pupils of a cohort of 1000 complete the primary cycle in 5 years and nobody repeats any grade and nobody drops out, the number of pupil-years spent by the cohort would be 1000x5 = 5000, and the number of graduates produced by the system would be 1000, with no one taking more than 5 years for graduating. The ratio of the number of pupil years to the number of graduates in this

District Sirsa (Haryana)
1996-97 and 1997-98

CHART 1

Hypothetical Flow of the Cohort of Primary Education
Male and Female



Pupil/years	
1	1190
2	1166
3	1158
4	1012
5	956
Total	5482
Graduates	843
Years/graduate	6.50
Input/output	1.30

ideal system is 5000:1000 or 5:1. In the case of a system in which some pupils repeat grades or drop out prematurely, this ratio will obviously be more than 5:1. This ratio which we may call Pupil-Years/Graduates Ratio (or PY/G ratio) is itself an important indicator of the years wasted by a cohort in producing primary graduates.

In the case of Sirsa district, we find that the ratio of pupil-years to the number of graduates is 5482:843 or 6.50:1. If we compare this ratio with the ideal ratio, we get an idea of inefficiency of the system.

The input-output ratio is simply the ratio of the PY/G ratio to the ideal ratio and can be written as:

$$\text{Input-output ratio} = \frac{\text{Total number of pupil-years}}{\text{Total number of graduates} \times k}$$

where k = number of grades in the system

The inverse of the input-output ratio is known as the Coefficient of Efficiency. The closer this coefficient is to 1, the more efficient the system is Usually, it is expressed in the form of a percentage, n which case its value will lie between 0 and 100.

Cohort Drop-out Rate and Average Duration of Study

The flow chart enables us to find out how many pupils out of the cohort of 1000 reach Classes 2, 3 ,4 and 5, when some of them repeat grades and some drop-out. The 'evolution of cohort' presented beneath the flow chart in Chart 1 provides information about how many drop out from each grade and how many move up the educational ladder from grade to grade out of the cohort of 1000, irrespective of the number of years taken by them to reach any given grade. In the case of Sirsa district, the cohort retention rate is 84.3% and the cohort drop-out rate is 15.7%.

It is also of interest to find out the Average Duration of Study for the cohort, for the graduates. To determine these averages we have to compute from the figures in the flow chart, the average number of years taken by the graduates to complete the primary cycle. In the example of Sirsa, the Average Duration of Study (ADS) for the graduates obtained is as follows:

$$\text{ADS (graduates)} = \frac{364 \times 5 + 287 \times 6 + 135 \times 7 + 57 \times 8}{843} = 5.9 \text{ years}$$

Proportion of Wastage Attributable to Repetition and Dropping-out

Since wastage occurs because pupils repeat grades and because pupils drop out from school, it is of interest to see how much these two factors individually contribute to the overall wastage. For this, we have to calculate: (a) the pupil-years wasted due to repetition and (b) the pupil-years wasted due to children dropping-out before completing the last grade:

In the case of Sirsa, we find that the total pupil-years wasted due to repetition are

(160+26+4) + (125+39+9) +...... + (53+41+19) = 190+173 + 217 + 153 + 113 = 846

The number of pupil-years wasted due to dropping out is calculated by adding up the number of pupil-years spent by the children in school who drop out after (or from) Class 1, Class 2, and so on. The number is:

$(5+0+1+1) \times 1 + (36+11+3+2) \times 2 + (44+23+7+8) \times 3 + (4+3+1+8) \times 4 = 7+104+246+64 = 421$

Thus, out of the total 846 + 421 = 1267 wasted pupil-years, 846 or 66.8% were wasted due to repetition and the rest 421 or 33.2% were wasted due to children dropping out before Class 5.

Computation of Retention and Drop-out Rates by the Traditional Method

(Without using the data on repeaters)

The retention rate derived by the traditional method is simply the ratio of the enrolment in the last class of the primary level to the enrolment in Class I of the year in which most children of the cohort started their primary education. Thus, for the primary cycle of four years, the retention rate for the period 1993-96 is the ratio of the Class IV enrolment of 1996-97 to Class I enrolment of 1993-94. Similarly, in the case of the 5-year cycle of primary education, the retention rate for the period 1993-97 is the ratio

of Class the V enrolment of 1997-98 to the Class I enrolment of 1993-94. This method is often used for estimating retention rate

Internal Efficiency Indicators for DPEP Districts

(a) Input-Output Ratio and Coefficient of Efficiency

Table 1 gives input-output ratios for male and female pupils and their total for all the DPEP districts of Phase I, except Dhar and Raigarh in Madhya Pradesh, for the year 1996-97. These two districts were excluded because of some obvious discrepancies in their data or due to lack of data This table gives the coefficients of efficiency (CE) also, the CE is just being the inverse of the input-output ratio expressed as percentage.

We find that out of the 40 DPEP districts, internal efficiency is good (CE being over 80) in 18 districts; satisfactory (CE between 70 and 80) in another 13 districts; and rather poor (CE below 70) in the remaining 9 districts. The Statewise distribution of the districts according to CE, is as follows:

1. *Good internal efficiency.(CE over 80) - 18 districts*

   Karnataka - Belgaum, Kolar and Mandya

   Kerala - Kasargod, Mallapuram and Wayanad

   Haryana - Kaithal

   Maharashtra - Latur and Osmanabad

   Madhya Pradesh - Betul, Guna, Rajgarh, Ratlam, Satna and Sahdol

   Tamil Nadu - Cuddalore, Thiruvannamalai and Villupuram

2. *Satisfactory internal efficiency with scope for further improvement (CE between 70 and 80) -13 districts*

   Karnataka - Raichur

   Haryana - Hisar, Jind and Sirsa

   Maharashtra - Aurangabad, Nanded and Parbhani

Madhya Pradesh - Mandsaur, Raisen, Rajnandgaon, Shahdol and Tikamgarh

Tamil Nadu - Dharmapuri

3. *Poor internal efficiency requiring definite measures for improvement (CE below 70) - 9 districts*

Assam - Darrang, Dhubri and Morigaon

Madhya Pradesh - Bilaspur, Guna, Panna, Rewa, Sidhi and Surguja

Of these, two districts of Assam (Dhubri and Morigaon) are very low in internal efficiency as their CE is only 48.8 and 56.8, respectively.

In terms of input-output ratio, we can say that in the 18 districts in which CE is over 80, this ratio is 1.25 or less, which means that the expenditure does not exceed by more than 25% that which would have been incurred in the ideal case of no wastage resulting from grade repetition and dropping out In the 13 districts in which CE is between 70 and 80, the input-output ratio is between 1.25 and 1.43. In these districts, the expenditure is 25 to 43 per cent more because of repetition and dropping out compared to the ideal case of no wastage. And in the nine districts in which CE is below 70, the expenditure is over 43% compared to the ideal case because of high rates of grade repetition and dropping out.

TABLE 1

Input-output Ratio, Coefficient of Efficiency and Cohort Drop-out Rate Based on Repetition Rates and Drop-out Rates of 1996-97

State/ District	*Input-Output Ratio*			PY/G Ratio	Coefficient of *Efficiency*			*Cohort Drop-out Rate*		
	Boys	Girls	Total		Boys	Girls	Total	Boys	Girls	Total
States with Class IV as the highest Class										
ASSAM										
Darrang	1.53	1.54	1 54	6.14	65.4	65 0	65.1	44.8	46.0	45.5
Dhubri	2.07	2.02	2.05	8.20	48.2	49.8	48 8	56.9	54.4	55.7
Morigaon	1.81	1.72	1.76	7.04	55.2	58.1	56.8	58.2	55.1	56.6
KARNATAKA										
Belgaum	1 25	1.22	1.24	4.95	81 7	79 8	80.9	9 2	12.6	10.7

State / District	Input-Output Ratio			PY/G Ratio	Coefficient of Efficiency			Cohort Drop-out Rate		
	Boys	Girls	Total		Boys	Girls	Total	Boys	Girls	Total
Kolar	1.09	1.11	1.10	4.41	91 4	89.8	90.6	6.5	9.1	7.8
Mandya	1.08	1.08	1.08	4.33	92.3	92 4	92.4	1.7	1.5	1.5
Raichur	1.26	1.32	1.29	5.15	79.1	76 0	77.7	22.6	28.4	25.2
KERALA										
Kasargod	1.06	1 04	1.05	4.20	94 8	95.9	95.3	1.0	2.2	1.7
Mallapuram	1,15	1.12	1.14	4.54	86 7	89.2	88.0	15.8	13.4	14.5
Wayanad	1.05	1.05	1.05	4.19	95.1	95.6	95.4	1.5	3.1	1.8
States with Class V as the highest Class										
HARYANA										
Hisar	1.26	1.32	1.28	6.42	79.4	76.0	77.8	14.8	21.1	17.8
Jind	1 25	1.29	1.27	6 34	80.0	77 4	78.9	20.0	20.8	20.0
Kaithal	1.26	1.28	1.25	6.24	80.1	79.5	80.1	18.6	19.3	16 9
Sirsa	1.30	1.32	1.30	6 50	76.7	75.8	76.9	14.7	18.4	15.7
MAHARASHTRA										
Aurangabad	1 30	1.33	1.31	6.57	76.9	75.4	76.1	33.0	34.5	33.7
Latur	1.17	1.22	1.20	5.98	85 3	81.9	83.6	21.1	26.3	23.7
Nanded	1.31	1.37	1.34	6.71	76.2	72.8	74.5	30.2	33.7	32.0
Osmababad	1.16	1.20	1.18	5.91	85.9	83.2	84.6	21.2	25.0	23 0
Parbhani	1.27	1.28	1.27	6 37	79 0	78.0	78.5	24.2	25.0	24.6
MADHYA PRADESH										
Betul	1.24	1.26	1.24	6 21	80.8	79.5	80.6	13.6	16.4	14.1
Bilaspur	1 53	1.66	1 59	7.93	65.3	60.3	63.0	49 5	56 5	52.8
Chhatarpur	1.12	1.15	1 13	5.66	89.1	87.0	88.3	9.0	11.4	9.9
Guna	1.44	1.89	1.59	7 94	69.3	53.1	62.9	35.1	53.6	42.7
Mandsaur	1.27	1.48	1.35	6.77	78.9	67.4	73.9	31.9	45.5	38.0
Panna	1.43	1.72	1.55	7.74	70.0	58.0	64.6	44.2	57.0	50.1
Raisen	1.32	1.26	1 29	6.45	75.7	79.2	77 5	39 1	29.9	34.9
Rajgarh	1.07	1.28	1.12	5.59	93.4	78 0	89.5	2.9	23.8	8.4
Rajnandgaon	1.29	1.34	1.30	6.52	77.8	74.7	76.7	28.5	33.4	30.3
Ratlam	1.12	1.16	1.13	5 67	89 6	86 4	88.2	13.1	18.0	15 2
Rewa	1.68	1.53	1 61	8 05	59.5	65.4	62 1	60.0	52.2	56.6

State/ District	*Input-Output Ratio*			PY/G Ratio	*Coefficient of Efficiency*			*Cohort Drop-out Rate*		
	Boys	Girls	Total		Boys	Girls	Total	Boys	Girls	Total
Satna	1.17	1.14	1.16	5.78	85.7	87.5	86.5	21.9	17.0	19.7
Sehore	1.19	1.28	1.22	6.12	83.9	78.1	81.7	23.5	28.7	25.4
Shahdol	1.28	1.31	1.29	6.47	78.1	76.2	77.3	38.1	39.3	38.6
Sidhi	1.39	1.53	1.44	7.18	71.8	65.4	69.7	39.6	48.0	42.6
Surguja	1.56	1.65	1.60	8.00	64.1	60.6	62.5	55.9	60.4	58.0
Tikamgarh	1.34	1.34	1.35	6.73	74.4	74.5	74.3	34.2	34.7	34.5
TAMIL NADU										
Cuddalore	1.19	1.18	1.19	5.93	84.0	84.5	84.3	10.8	9.0	9.8
Dharampuri	1.28	1.27	1.28	6.38	78.3	78.5	78.3	25.1	25.2	25.3
Thiruvannamalai	1.18	1.17	1.18	5.88	85.0	85.1	85.1	12.2	12.1	12.2
Villupuram	1.23	1.26	1.24	6.21	81.5	79.5	80.5	12.7	17.7	15.1

Ratio of Pupil-Years to Number of Graduates

The ratio of number of pupil-years that a cohort of 1000 spends in school to the number of graduates eventually produced out of the cohort, gives an idea of the years required to produce a primary graduate. In the ideal case, that is 5 years if the primary cycle is of 5 years duration. If it is more than 5 years, that is due to the time wasted because of repetition and dropping-out. Table 1 gives the values of this ratio as Pupil-Years/Graduates Ratio (PY/G ratio) in one of the columns for the total pupils (boys+girls). Actually, this ratio divided by the value of the ideal PY/G ratio (that is, 4 in the case of the 4-year primary cycle and the 5 in the case of the 5-year cycle) is the input-output ratio.

We find that among the States with the 4-year cycle of primary education, in Assam 6 to 8 pupil-years are required to produce a primary graduate, instead of the ideal 4 years. Of the three districts, Dhubri is the worst with PY/G ratio of 8.20. In Karnataka, the number of pupil-years needed to produce a primary graduate ranges between 4.33 (in Mandya) and 5.15 (in Raichur). In Kerala, the situation is relatively better since the PY/G ratio is only 4.2 in two districts, Kasargod and Wayanad. It is, however, a little higher (4.54) in Mallapuram.

Among the States with 5-year primary education cycle, in Haryana, the PY/G ratio ranges between 6.24 to 6.50, which means that 25% to 30% more time is spent for producing a primary graduate In Maharashtra, the PY/G ratio lies between 5.9 to 6.6; and in Tamil Nadu, between 5.9. and 6.4. In Madhya Pradesh, the variation in the values of PY/G ratio is quite large over the districts. It is as low as 5.6 in Rajgarh and as high as 8.0 in Rewa and Surguja. Out of 17 districts, in six it is between 7.0 and 8.0; in seven, it is between 6.0 and 7.0 and in the remaining four, it is between 5.6 and 6.0.

The median value of PY/G ratio for the 10 districts with the 4-year primary cycle is 4.4 years, and for the 30 districts with the 5-year primary cycle, it is 6.4 years.

Cohort Drop-out Rate

Table 1 also gives the drop-out rate for the cohorts entering Class I based on the repetition and drop-out rates of 1996-97. If in any grade the drop-out rate was negative, it was assumed to be 0.5%.

Among the States with Class IV as the highest class, Assam has the highest drop-out rate as over 45% children drop-out before Class IV. In Dhubri and Morigaon, the situation is particularly bad as between 55 and 57 per cent children of Class I drop-out before Class IV, whereas in Darrang 45.5% do so. In Karnataka, only in Raichur the drop-out rate is as high as 25.2%. In Belgaum it is 10.7%, in Kolar it is 7.8% and in Mandya, it is as low as 1.5%. In Kerala, only in Mallapuram the drop-out rate is somewhat high (14.5%); in the other two districts, it is below 2%. In the States where Class V is the highest class, the drop-out rate is the percentage of pupils of the Class I cohort who drop-out before Class V. In Haryana, this drop-out rate is highest in Jind (20 0%), while in the other three districts it is between 15 and 18 per cent. In Maharashtra, the drop-out rate is rather high in Aurangabad and Nanded (between 32 and 34%), but relatively low in the other three districts (between 23 and 25 per cent). In Madhya Pradesh, as the number of districts is large, the variation in drop-out rate is also large, ranging between 8% and 58%. The districts with very high dropout rate (between 50 and 58%) are Bilaspur, Panna, Rewa and Surguja. In Tamil Nadu, only in Dharampuri, the drop-out rate is as high as 25.3%. In

the remaining three districts, it is between 10 and 15 per cent.

Out of the 40 districts, we find that the cohort drop-out rate is below 10% in 7 districts; between 10 and 20% in 10 districts, between 20 and 30% in 7 districts; between 30 and 40% in 7 districts; and between 40 and 60% in 9 districts.

Average Duration of Study for Graduates

The average duration of study for the graduates or completers of primary education is the average number of years they take to complete the highest grade of the primary cycle. In Assam, they take 4.7 to 5.8 years instead of 4.0 years because of high repetition rates. In Karnataka and Kerala, they take 4.2 to 4.3 years instead of 4.0 years (except in Belgaum where it is 4.6 years). In the other four States, where the primary cycle is of 5 years duration, they take: 5.7 to 5.9 years in Haryana; 5.2 to 5.4 years in Maharashtra (where the repetition rates are relatively lower) and 5.5 to 5.6 years in Tamil Nadu. In Madhya Pradesh, the variation is large. In some districts, they take only 5.1 to 5.3 years; in others, they take 5.6 to 5.8 years to complete Class V.

Proportion of Wastage Attributable to

(a) Grade Repetition, and (b) Dropping Out

Here, the question being addressed is this: of the two factors, 'grade repetition' and 'dropping-out from school before completing the full primary cycle', which one contributes more to wastage and how much is the relative contribution of each of these. The method of calculation of these percentages is explained with an example in Section 4. Obviously, where the repetition rates are high compared to drop-out rates, the proportion of total wastage attributable to grade repetition is higher.

In some districts, the grade repetition has contributed more to wastage, and in others, the contribution of 'dropping-out' was more. In 23 districts out of the forty, 'dropping-out' has contributed more to the total wastage as compared to 'grade repetition'. These are: Morigaon in Assam; Raichur in Karnataka; Mallapuram in Kerala; all the 5 districts in Maharashtra; 14 out of 17 districts in Madhya Pradesh; and Dharmapuri in Tamil Nadu.

Gender Differences in Internal Efficiency

Coefficient of Efficiency

In general, the gender difference in respect of internal efficiency is small in most of the districts. In 24 districts out of the 40 covered in this study, the coefficient of efficiency in the case of the girls is not very different from that of boys, the difference between the two being less than 3 points. In 14 districts, the coefficient for girls is less than that for boys. Of these 14 districts, ten are in Madhya Pradesh. In only two districts (Raisen and Rewa in Madhya Pradesh), the coefficient of efficiency for girls is substantially higher than that for boys.

Cohort Drop-out Rate

Of the 40 districts, the drop-out rate of girls exceeds that of boys in 25 districts, while it is almost equal to that of boys in 5 districts (the difference between the two being less than 1 point) and less than that of boys in 10 districts. However, only in 11 out of the 40 districts, the cohort drop-out rate of girls exceeds that of boys by 5.0 or more percentage points (the percentage points by which the drop-out rates of girls exceeds that of boys are shown for each district in parenthesis). Hissar (6.3) in Haryana; Raichur (5.8) in Karnataka; Latur (5 2) in Maharashtra; Villupuram (5.0 in Tamil Nadu; Bilaspur (7 0), Guna (18.5), Mandsaur (13.6), Panna (12.8), Rajgarh (20.9), Sehore (5.2) and Sidhi (8.4) in Madhya Pradesh.

An odd case is that of Rajgarh where the drop-out rate of boys is as low as 2.9% and that of girls is 23.8%. It could be due to some error in the Rajgarh data.

Retention and Drop-out Rate Derived by the Apparent Cohort Method-Changes Over the Period 1993-94 to1996-97

In the absence of data on repeaters, the retention rate is derived simply by comparing the enrolment in the successive grades in successive years. The method, known as the Apparent Cohort Method, however, provides only approximate estimates of the drop-out rate, since the model assumes that the pupils are either

promoted or they drop-out. The fact that they also repeat grades is ignored. Here we are using this method to assess the drop-out rate for the Phase I DPEP districts in two ways: (i) by comparing the enrolment of Class I in 1993 (obtained from the Sixth All India Educational Survey) with that of the last grade of the primary cycle in the year in which the pupils of this cohort are expected to be in the last grade (this is the traditional approach); (ii) by comparing the enrolment of Class I and other grades in 1996-97 with the enrolment in the successive grades in the following year.

Table 2 gives the drop-out rates obtained by these methods for the 23 districts of six states, excluding those of Madhya Pradesh for which the relevant data was not available.

TABLE 2

Drop-out Rates Based on Class I Cohort of 1993 and Grade-to-Grade Progression Rates of 1996-97 between Class I and Class IV/V, Using the Apparent Cohort Method.

State/ District	*Droup-out Based on the 6th AIE Survey (1993), Cohort of Class I*			*Droup-Out Based on Grade-toGrade Progression Rates of 1996-97*			*Decrease in Drop-out Rate*			*Gender Differences*	
										1993	*1996*
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Boys
States with Class IV as the highest Class											
ASSAM											
Darrang	67.1	67.9	67.4	52.8	55.7	54.2	14.3	12.2	13.2	-0.8	-2.9
Dhubri	73.9	74.4	74.1	73.6	73.7	73.7	0.3	0.7	0.4	-0 5	-0.1
Morigaon	70.1	70.7	70.4	68.5	66 9	67.7	1 6	3.8	2.7	-0.6	1.6
Total	70.7	71.2	70.9	65.8	66.4	66.1	4.9	4.8	4.8	-0.5	-0.6
KARNATAKA											
Belgaum	16.4	19.7	19.8	12.7	16.6	14.6	3.7	3.1	5.2	-3.3	-3.9
Kolar	22.0	26.3	24.1	4.5	10.3	7.4	17.5	16	16.7	-4.3	-5.8
Mandya	39.4	50.6	44.4	-7 8	1.0	-3.4	47.2	49.6	47.8	-11.2	-8.8
Raichur	21.1	22 9	22.0	25.3	35.3	28.6	-4.2	-12.4	-6.6	-1.8	-10.0
Total	24.9	29.8	27.3	12.3	17.3	14.7	12.6	12.5	12.6	-4.9	-5 0
KERALA											
Kasargod	0.7	2.9	1.8	-9.9	-6.6	-8.3	10.6	9.5	10 1	-2.2	-3.2
Mallapuram	-1.3	0.5	-0.4	8.2	7.6	7.9	-9.5	-7.1	-8.3	-1.8	0.6

State/ District	Droup-out Based on the 6th AIE Survey (1993), Cohort of Class I			Droup-Out Based on Grade-toGrade Progression Rates of 1996-97			Gender Decrease in Drop-out Rate			Differences 1993	1996
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Boys
Wayanad	12	10.2	11.2	-7.7	-8.6	-8 2	19.7	18.8	19.4	1 8	0.9
Total	0.8	2.2	1 5	2.9	3.0	2 9	-2.1	-0.8	-1 4	-1.4	0.1
States with Class V as the highest Class											
HARYANA											
Hisar	23 8	27 1	25.0	8.9	18.6	13.5	14.9	8.5	11.5	-3.3	-9.8
Jind	22.2	26.5	24.1	25.4	27.1	26 1	-3.2	-0.6	-2.0	-4.3	-1 7
Kaithal	23.3	26.5	24.7	21.7	26.0	23.5	1.6	0.5	1.2	-3.2	-4.3
Sirsa	31.6	34 5	32.9	12.5	23.0	17.5	19.1	11.5	15.4	-2.9	-10.6
Total	24 8	28.5	26.4	16 1	22.9	19.2	8.7	5.6	7 2	-3.7	-6 8
MAHARASHTRA											
Aurangabad	29.4	32.4	30.8	36.1	37.8	36.9	-6.7	-5.4	-6.1	-3.0	-1
Latur	27.3	31.3	29.3	23.0	27.8	25.4	4.3	3.5	3.9	-4.0	-4.8
Nanded	43.3	46.3	44.8	32.6	35 8	34.2	10.7	10.5	10.6	-3.0	-3.2
Osmanababad	30.4	33.0	31.6	23.0	26.7	24.8	7.4	6.3	6.8	-2.6	-3.6
Parbhani	30.5	37.7	34.0	27.7	29.4	28.5	2.8	8.3	5.5	-7.2	-1.7
Total	33 1	37.2	35.1	29.6	32.4	31	3.5	4.8	4.1	-4.1	-2 8
TAMIL NADU											
Cuddalore	14.3	13.5	13.9	13.7	12.4	13.1	0.6	1.1	0.8	0.8	1.3
Dharampuri	34.3	35.6	34.9	26.7	27.3	27 0	7.6	8.3	7.9	-1.3	-0 6
Thiruvanna-malai	20.9	21.2	21.1	13.2	14.4	13.8	7.7	6.8	7.3	-0.3	-1.3
Villupuram	27.4	28.2	27.8	12.9	19.9	16.5	14.5	8.3	11.3	-0.8	-7.0
Total	25.6	26.1	25.8	17.2	19.2	18.2	8.4	6.9	7.6	-0.5	-2.0

It is interesting to compare the drop-out rates obtained from the 1993 enrolment figures of Class I with the drop-out rates based on grade-to-grade progression rates of the year 1996-97 derived from the EMIS data. In a way such a comparison is valid, since in both cases, the repeaters are ignored and the number of drop-outs for grade i is determined in terms of difference in the enrolment in grade I of year t and the enrolment in grade I+1 of year t+1. When we compare the two drop-out rates in States with the 4-year cycle of primary education, we actually compare the cumulative effect of the progression rates of Classes I, II and III for the years 1993-94, 1994-95 and 1995-96, respectively,

with the cumulative effect of the progression rates of these grades for the year 1996-97. If the drop-out rate has decreased it is due to improvement in progression rates of Class I between 1993-94 and 1996-97, of Class II between 1994-95 and 1996-97 and of Class III between 1995-96 and 1996-97. In the States, where Class V in the last grade of primary level, the Class V enrolment figures of 1997-98 have been used instead of those of 1996-97.

On comparing the drop-out rates based on the 1993 cohort and those obtained by the Apparent Cohort Method applied to the 1996-97 enrolment data, we find that the drop-out rate has decreased in 19 out of 23 districts of Assam, Karnataka, Kerala, Haryana, Maharashtra and Tamil Nadu. The four districts where an increase in the drop-out rate occurred are: Raichur, Mallapuram, Jind and Aurangabad. Of these, only Raichur and Aurangabad are worthy of attention, since in Mallapuram, the drop-out rate was still only 7.9% in 1996-97 and in Jind, the increase was of only 2 percentage points. The unusual decrease in the drop-out rate of Mandya (from 44.4% to -3.4%) is probably due to some fault in the data.

Conclusion

The study of internal efficiency in the DPEP Phase-I districts, based on the EMIS data of 1996-97 and 1997-98, has provided district-level indicators to assess the wastage resulting from grade repetition and dropping out. The input-output ratio exceeds 1 25 in 18 out of 40 districts, showing that 20% or more resources are wasted in these districts due to children repeating grades and/or dropping out before reaching the last grade. The percentage of resources so wasted exceeds 50% in 8 out of the 40 districts. The cohort drop-out rate is below the ideal 10 per cent in only 7 districts and it is below 20 per cent in 18 districts out of the forty. The variation in the drop-out rates between districts is quite large. It is necessary to intensify efforts to reduce wastage, particularly in the districts that have high repetition/drop-out rates.

Due to lack of data on repeaters for the pre-DPEP years, it was not possible to assess how the internal efficiency has improved in the recent years due to DPEP interventions. However, by estimating the cohort drop-out rates by the traditional method

for 1993 and the apparent cohort method for 1996 we find that in 19 out of 23 districts (excluding those of Madhya Pradesh), there has been some improvement in the retention rate over the period 1993-97.

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3

An Appraisal of Students' Achievement during Mid-Term Assessment Survey under DPEP

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The study was based on the data collected for the Mid-term Assessment Survey in 42 districts of DPEP Phase-I States. The objective of the study was to evaluate whether DPEP was fulfilling its goals in terms of students' achievement in language and mathematics both in Class I and in the penultimate class of primary education. The study also analysed the effects of variables like home, school and teacher on students' achievement. The analysis of results revealed the pre-eminence of the element of contextuality. The students seemed to have displayed better performance in Class I than in Classes III and IV, both in language and in mathematics. The findings of the study also revealed that the goal of reducing achievement differences has been achieved in almost all the districts in regard to gender and in many of the districts in regard to area and social groups.

Introduction

Prior to operationalising the District Primary Education Programme (DPEP) in 1994, a number of studies were conducted to establish the benchmark for planning research-based interventions in all the forty-two project districts spanning the seven States covered under Phase-I Of these studies, the Baseline

Assessment Study (BAS) was singularly devoted to assessing students' achievement both in language and mathematics. The target population of this study was the student group that had passed the initial stage (Class-I) and the penultimate stage (Class III/IV) of primary schooling. This mega study covered over 50,000 students, 5,000 teachers and 1800 schools. The BAS was itself a unique proposition after the earlier national studies on attainments of primary school children carried out in 1965-66 in mathematics (Kulkarni, 1970) and in 1990 in language and mathematics by the NCERT (Shukla et al 1994). Enormous amounts of data were generated out of the BAS which was analysed and interpreted for the purposes of identifying the area-specific interventions to realise the goals of the DPEP.

Mid-Term Assessment Survey - the Midway Checkpoint

As per the stipulations of the World Bank Report No. 13072, on page 42 para 3.23 (1), November 1994, assessment studies were to be carried out in all project districts during the third and the sixth year of the project. The exercise of conducting the Mid-Term Assessment Survey (MAS) was thus undertaken after a gap of three years to find out whether or not the programme was moving in the right direction to realise the goals of the DPEP. The Mid-Term Assessment Survey was mounted with the focus on the following objectives:

Objectives

1 To measure the average performance of students' achievement on the newly generated competency-based achievement tests in language and mathematics at the end of Class I and at the end of penultimate class of primary schooling.

2 To compare the average performance of students' achievement on the BAS tests administered during the initial survey in 1994 with that of students' performance on the same tests readministered subsequent to the MAS tests administered in 1997.

3. To compare the achievement differences in regard to gender and social groups on MAS tests.

4. To study the effect of variables like home, school and teacher on students' achievement.

Design of the Survey

The Normative correlational survey design was employed for conducting the Mid-Term Assessment Survey.

Population: The Mid-Term Assessment Survey was targeted to cover the 42 districts of the DPEP Phase-I States. The States are Assam, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra and Tamil Nadu.

Time: As per the decision of the Advisory Committee, the MAS was conducted in the aforesaid States at the commencement of the academic session except in the State of Assam where the MAS was conducted four weeks prior to the closing of the academic session.

The data collection for MAS was undertaken in the months of July-August 1997 in the States of Maharashtra, Tamil Nadu, Kerala, Karnataka and Haryana; in the months of August-September 1997 in the State of Madhya Pradesh; and in the months of November-December 1997 in the State of Assam.

Tools: The following tools were employed for conducting the Mid-Term Survey:

1. Achievement tests both in literacy and numeracy for Class I and in language and mathematics for Class III/IV students.
2. School Record Schedule, Teachers' Schedule and Student Present Schedule
3. Field Notes, Training Manual and Field Handbook.

Sampling Design

The multistage stratified random sampling technique was employed for the selection of various constituents of the MAS.

Target Population:	The target population used in the MAS is given as under·
Schools:	All Government and Government aided primary schools, including primary sections (I-IV/V) attached to upper primary/secondary/senior secondary schools.
Teachers	All teachers including the Head Teacher.
Students:	(i) All students at the end of the initial stage of primary schooling
	ii) All students at the end of the penultimate stage of primary schooling (III/IV).

It may be pertinent to mention here that the tests employed under MAS-1997 were different from those used under BAS-1994 and that these new tests employed under MAS were developed by the Ed.CIL.

Data Collection

The data under MAS were collected by the trained Field Investigators under the direct monitoring and supervision of Master Trainers and Principal Investigators in each State. Since the achievement tests employed under MAS were different from the earlier tests used in the initial survey (BAS), they were used only for assessing the average performance of students and for finding achievement gaps between gender and social groups. However, the hike in students' achievement was ascertained by readministering the earlier tests used in 1994 subsequent to the MAS tests to the students of five randomly selected schools out of the total number of sampled schools in each project district. The batching and scrutiny of the data were carried out at two levels, one, at the district level and two, at the State level, before

subjected to statistical analyses. The MAS data covered students, 6221 teachers and 2068 schools spread over ricts across seven Phase-I States. The State-wise details en as under:

TABLE-1

State-wise Distribution of Total Sample

tate	No. of Districts	No of Schools	No. of Students Class I/ II	Class III/IV	No of Teachers
ssam	3	150	2429	2164	418
laryana	4	190	3435	3975	623
arnataka	4	200	3008	3323	638
erala	3	128	2447	3403	601
1.P.	19	950	11700	11798	2390
1aharashtra	5	250	4165	5356	888
'amil Nadu	4	200	3461	4010	663
'otal	42	2068	30645	34029	6221

nalysis

ata were subjected to computation of mean, standard on, CR values, co-efficient of correlation and test and item eters.

.s

Percent of Achievement of Class I Students

erformance demonstrated by Class I students both in ge and mathematics across the seven states is portrayed le 2.

nalysis of results reveals that of all the States, the its of Assam and Kerala displayed better performance in e subjects than their counterparts. However, the students rnataka and Haryana tended to approximate their mance with Assam and Kerala, followed by Maharashtra, Nadu and Madhya Pradesh. The analysis also highlighted most of the districts the students' performance followed ntical pattern of growth and sequence. As regards the

TABLE-2

Mean Per cent of Achievement of Class I Students in Language and Mathematics on MAS

State	District	N	Language		Mathematics	
			M%	SD	M%	SD
Assam	Darrang	723	75.45	25.70	74.45	25.90
	Dhubri	908	67.30	28.55	71.55	26.00
	Morigaon	798	78.10	22.60	77.75	21.85
Haryana	Hissar	857	69.73	29.02	74 13	28.73
	Jind	919	63 28	29.79	70.90	25 93
	Kaithal	726	71.47	26 09	81.03	20 97
	Sirsa	933	73.75	26.03	80.58	23 09
Karnataka	Belgaum	593	85.50	20.00	87.25	18.65
	Kolar	488	61.15	26.90	62.45	25.91
	Mandya	596	64 50	29.65	64.30	27.55
	Raichur	708	67.85	28.35	71.55	25.95
Kerala	Kasargod	907	75.30	22.85	73.60	25.20
	Malappuram	985	81.45	19.65	76.10	23.65
	Wayanad	555	69 30	19.65	66.10	24 45
Madhya Pradesh	Chattarpur	747	56.96	5.40	56.20	7.90
	Panna	512	51.50	12.00	55.68	12.90
	Rewa	701	44.52	27 25	48 25	32.00
	Satna	756	50.95	6.00	38.85	15.95
	Sidhi	624	58.40	23.70	52 93	20.74
	Tikamgarh	467	57.25	24.50	66.00	28.55
	Bilaspur	813	69.90	14 20	71.85	11 35
	Rajnand-gaon	491	69.65	8.50	67 90	6 45

State	District	N	Language		Mathematics	
			M%	SD	M%	SD
	Raigarh	620	61.25	12 85	64.10	9.55
	Surguja	537	49.35	28.20	51.02	29.05
	Shahdol	508	50.85	24 11	45.55	27.89
	Betul	784	64.85	18 50	59.80	9 70
	Dhar	537	58.50	25.95	58.85	25.28
	Guna	581	63.67	16.08	36.51	21 50
	Mandsaur	719	55.25	23.76	55.20	26.38
	Rajgarh	680	53.65	17.85	54.00	26.85
	Raisen	351	69 45	25.80	66 24	27.15
	Ratlam	612	56 60	13.75	58.60	7 00
	Sehore	660	54.25	15.25	54 75	12.90
Maharashtra	Aurangabad	845	70.62	29.60	66.46	30 00
	Latur	864	64 69	35.70	66.02	33.20
	Nanded	762	59.11	31.80	52 19	33 60
	Osmanabad	830	79 02	26 30	75 10	30.20
	Parbhani	864	58.63	33.20	57.91	33.40
Tamil Nadu	Dharampuri	874	58 81	30.00	53.11	33.88
	Cuddalore	840	66.49	25.40	62.50	30.36
	Thiruvannamalai	832	56.34	26.68	52.27	32.68
	Villupuram	915	79 40	19.98	77.60	24.92

distribution of achievement scores, the entire range was utilised in both the subjects in all the States, except in Madhya Pradesh in language. The higher range claimed the maximum number of cases in most of the States. Besides, positive upward progression of frequencies was observed against higher intervals that tended to produce negatively skewed distribution in a large number of cases. The results also revealed that the average performance in 25 districts in language and in 24 districts in mathematics crossed the 60% level. Except two districts in language and four in mathematics in the State of Madhya Pradesh, all other districts have crossed the 50% level of achievement in the two subjects.

Mean Per cent of Achievement of Class III Students

Students' performance displayed by Class III students both in language and mathematics across four States is shown in Table 3.

TABLE-3

Mean Achievement of Class III Students in language and Mathematics on MAS

State	*District*	*N*	*Language*		*Mathematics*	
			M%	*SD*	*M%*	*SD*
Assam	Darrang	656	58.11	19.72	59.18	29.53
	Dhubri	777	57.48	19.74	61.25	25.55
	Morigaon	731	58.38	16 43	55.58	21.90
Karnataka	Belgaum	937	51.63	22.25	57.98	25.58
	Kolar	763	37.94	19.66	33.98	19.83
	Mandya	913	42.28	20.92	41.30	25.80
	Raichur	857	47 26	20.98	48.33	24 98
Kerala	Kasargod	1254	51.29	17.75	38.83	17.25
	Malappuram	1371	53.38	15.34	37.03	15.98
	Wayanad	788	49.97	16 65	37.10	16.85

State	District	N	Language		Mathematics	
			M%	SD	M%	SD
Maharashtra	Aurangabad	1120	46.82	21 90	36.43	25.00
	Latur	1117	40.22	18 60	26.87	17.70
	Nanded	996	38 06	21.00	24.82	19.30
	Osmanabad	1091	43.67	17.40	31.82	17.10
	Parbhani	1029	36.24	14.60	23.44	14.10

The results revealed that while in some districts the student performance touched almost the 60% mark in both the subjects, in others it stood below the 40% mark. Of all the States, the State of Assam demonstrated better performance than their counterparts. It may be pertinent to mention here that even in Class I Assam had outscored the other States. While the performance of the students of Kerala touched the 50% mark in all the three districts in language, it was below 40% in mathematics. In Maharashtra, although the students' performance in language touched the 46% mark, it could hardly touch the 36% mark in mathematics.

It is also evident from the results that all the three districts of Assam rendered identical performance in language. The States of Karnataka and Maharashtra showed an identical pattern of growth and sequence. In so far as the distribution of achievement scores in language and mathematics was concerned, the entire range was utilised by them in all the four States. In contrast to Class I, in Class III the higher range claimed the least number of cases in three out of four States. The distribution of achievement scores tended to produce a non-skewed distribution in Assam in both the subjects and only in language in Kerala. A positively skewed distribution was observed in both subjects in Karnataka and Maharashtra, and only in mathematics in Kerala.

Mean Per cent of Achievement of Class IV Students

The students' achievement demonstrated by Class IV students in language and mathematics across three States is presented in Table 4.

TABLE-4

Mean percent of achievement of class IV students in language and mathematics on MAS

State	*District*	*N*	*Language* M%	*Language* SD	*Mathematics* M%	*Mathematics* SD
Haryana	Hissar	996	38.30	10 10	43.31	19.62
	Jind	1020	37.58	10.93	39.73	17.87
	Kaithal	891	42.67	10 80	45.02	16.99
	Sirsa	1027	46.89	10.13	60.64	20.92
Madhya Pradesh	Chattarpur	541	41.84	5.24	36.12	5.20
	Panna	503	35.73	3.49	24.97	6.87
	Rewa	760	35.91	13 11	24.10	15.50
	Satna	788	30.91	9.97	23.09	4.12
	Sidhi	593	38 84	9.89	28.65	15.05
	Tikamgarh	512	40.63	17.99	30.93	18.00
	Bilaspur	792	48.31	10.46	36.28	6.88
	Rajnandgaon	538	34.41	3.33	24.97	7.20
	Raigarh	626	43 34	3.87	30.13	4.25
	Surguja	505	43.83	10.10	29.78	10.79
	Shahdol	589	32.07	16.88	22.67	14.91
	Betul	887	40.81	3.68	35.59	7 85
	Dhar	544	40.46	16.85	31.75	18.00
	Guna	495	32 60	6.00	32.77	8.60
	Mandsaur	721	39.60	13.31	26.60	10.75
	Rajgarh	568	34.06	5.07	34.90	10.25
	Raisen	424	37.60	17.53	30.62	19 53
	Ratlam	563	35.25	3.68	29.55	5.55
	Sehore	849	31.97	3.40	20.60	2.57

State	*District*	*N*	*Language*		*Mathematics*	
			M%	*SD*	*M%*	*SD*
Tamil Nadu	Dharampuri	1030	44.17	14 64	37.78	19.73
	Cuddallore	957	59.77	18.33	47.55	24 55
	Thiruvanna malai	921	43.63	17.21	30.94	17.91
	Villupuram	1102	51 25	14.46	50.98	20 85

The analysis of the results revealed that while in some of the districts the students' performance almost touched the 60% mark, in others it stood below the mark of 40%. The students of Tamil Nadu demonstrated better performance in language than the students of Haryana. But in mathematics the position was reversed, Like in Tamil Nadu, in M.P. the students exhibited better performance in language than in mathematics. The State of Haryana registered a sequential pattern of growth in both the subjects. As regards the distribution of scores, the entire range was utilised in both the subjects in Tamil Nadu and only in mathematics in Haryana. Further, achievement scores tended to produce a non-skewed distribution in language in Tamil Nadu and in mathematics in Haryana. The distribution of scores in language in Haryana, in mathematics in Tamil Nadu and in both the subjects in M.P. tended to produce a positively skewed distribution.

The data further revealed that unlike in Class I, the average performance of students in Class III/IV was found to be below 50% in 34 districts in language and in 36 districts in mathematics. Of these, there were three districts in Maharashtra and ten in Madhya Pradesh where the average performance in mathematics stood below the 30% level. Dhubri in Assam and Sirsa in Haryana were the only two districts where the average performance in mathematics crossed the 60% level.

Comparative Profile of Class I Students in Language on BAS 1994 with 1997

Table 5 portrays a comparative profile of Class I students' achievement in language on BAS tests conducted in 1994 with that of the same set of tests readministered in 1997.

TABLE-5

Comparison of Achievement of Class I Students in Language on the BAS test Administered during the Initial Survey and the Mid-term Survey

State	*District*	BAS test administered during *Initial Survey (1994)* (1)			*Mid-Term Survey (1997)* (2)			*Difference*	*CR Value*
		N	*M%*	*SD*	*N*	*M%*	*SD*	*(2-1)*	
Assam	Darrang	595	58.47	19 15	72	84.49	19.00	26.02	10 91*
	Dhubri	580	59 25	14.60	99	60.75	30.45	1.50	0.48
	Morigaon	400	66.68	15.00	55	60.17	25.05	-6.51	-1.86
Haryana	Hissar	621	53.10	37 83	94	60.80	32.96	7.70	2.06*
	Jind	552	55 30	39.26	86	56.28	37.79	0.98	0.22
	Kaithal	665	53.30	39.32	78	67.37	35.12	14.07	3.29*
	Sirsa	593	50.95	38.01	94	67.55	31.34	16.60	4.60*
Karnataka	Belgaum	714	61.76	34.67	69	87.76	10.90	26.00	14.03*
	Kolar	586	46.39	30.98	50	81.73	11.05	35.34	17.38*
	Mandya	587	56.01	32.59	30	87.79	8.80	31.78	15.02*
	Raichur	613	57.96	33.03	5	88.70	5.45	30.74	10 11*
Kerala	Kasargod	722	69.00	33.50	85	65.70	26.95	-3.30	-1.07
	Malappuram	794	66.00	33.00	96	73.55	30.80	7.55	2.24*
	Wayanad	714	65.50	33.50	82	47.46	29.15	-18.04	-5.28*
Madhya Pradesh	Chattarpur	366	39.80	18.10	68	61 54	4.85	21.74	19.46*
	Panna	273	26 20	17.00	44	45.00	7.50	18.80	12 21*
	Rewa	511	48.40	16 70	81	47.73	16.50	-0.67	-0.34
	Satna	451	41 00	17.95	90	49 60	6.00	8.60	8.12*
	Sidhi	475	44.70	17.95	49	35.51	4 00	-9.19	-9.13*
	Tikamgarh	372	37.10	19.70	54	38.31	12.00	1.21	0.62
	Bilaspur	670	65.10	15.90	64	59 67	10 05	-5.43	-3.86*
	Rajnand gaon	612	61.70	15.70	54	58.06	15.00	-3.64	-1.69
	Raigarh	316	60.00	16.85	69	52.38	16.00	-7.62	-3.53*
	Surguja	297	49.90	17.75	43	52.30	23.50	2.40	0.64
	Shahdol	361	49.90	17.30	34	56.55	27 00	6.65	1.39

		DAS test administered during							
		Initial Survey (1994)			*Mid-Term Survey (1997)*				
State	*District*	*(1)*			*(2)*			*CR Value*	*Difference*
	Betul	583	56.20	18.00	83	42.66	15.50	-13 54	-7.25*
	Dhar	471	49.10	18 50	63	39 67	26 50	-9.43	-2 72*
	Guna	414	37.30	18.50	55	58 27	12 00	20.97	11.22*
	Mandsaur	479	52.40	18.00	69	53 34	9 00	0.94	0.69
	Rajgarh	368	55.80	18.00	68	39 00	23 50	-16.80	-5 56*
	Raisen	370	45.60	17.50	47	70.00	14 00	24 40	10.81*
	Ratlam	497	61.60	18.50	78	60.00	16.00	-1.60	-0 80
	Sehore	445	35.20	21.00	60	58.00	9.50	22.80	13 89*
Maharashtra	Aurangabad	674	53.60	34.75	100	65.65	31.20	12.05	3.53*
	Latur	756	54 10	36.85	99	42 90	40.95	-11.20	-2.57*
	Nanded	634	37.60	37.80	88	63 65	30.55	26.05	7.22*
	Osmanabad	719	44.65	38.95	77	55.90	33.50	11.25	2.74*
	Parbhani	714	67.50	36.45	94	46.95	35 25	-10.55	-2.70*
Tamil Nadu	Dharampuri	574	39.55	27.82	100	44.70	33.55	5.15	1.44
	Cuddallore	740	40 25	27.36	95	40.95	26 07	0.70	0.24
	Thiruvannamalai	542	32 45	26.37	83	38.61	28.74	6.16	1.83
	Villupuram	—	40.25	27.36	91	52.75	34.08	12.60	3.35*

*p <.05

The figures posted in Table 5 reveal that Class I students' performance in language showed positive trends in 28 out of 42 districts; of these, 19 districts showed significant improvement. Karnataka is the only State in which all the districts demonstrated significant improvement in language achievement, ranging from 26-36%. Of the 42 districts, 6

districts demonstrated a hike in achievement in language that ranged from 25% to 36%, 10 districts from 10% to 25%, and 12 districts up to 10 per cent. However, in the case of 14 districts, achievement suffered a decline that ranged from 0 per cent to 18 percent. Six districts in Madhya Pradesh, two in Maharashtra and one in Kerala showed significant decline in achievement.

It may be pertinent to mention here that the BAS tests used in 1994 and in 1997 were developed in the year 1994, obviously on the then prevailing syllabi Apparently, the BAS 1994 tests were compatible with the existing curricular material, during the initial survey. By 1997, several States had undergone a change in the curriculum and in instructional material under the aegis of the DPEP. Those districts and States that could enable the students to acquire the basic competencies through DPEP interventions, thus striking a balance between the test contents and the changed course contents, performed better than the others. Because of this very reason the test happened to produce varied results in language achievement, both within a State and across the States.

Comparative Profile of Class I students in Mathematics on BAS 1994 with 1997

Table 6 displays a comparative profile of Class I students in mathematics.

The data printed in Table 6 reveals that students' performance in mathematics in Class I showed positive trends in 33 out of 42 districts, 30 of them showing a significant hike. Of these 30 districts, in 9 districts the hike in achievement ranged from 25 to 44 %, in 18 districts from 10 to 25 % and in three districts up to 10 per cent. All districts in Haryana, Karnataka and Tamil Nadu had registered a significant hike in achievement in mathematics. One district in Kerala and six in Madhya Pradesh turned out to be such districts wherein the performance of students plummeted significantly. Besides, two districts, one each in Assam and Maharashtra, demonstrated a downward performance, though not significant. The overall performance of Class I students in mathematics turned out to be better than in language.

TABLE-6

Comparison of Achievement of Class I Students in Mathematics on the BAS Test administered during the Initial Survey and Mid-term Survey.

State	District	BAS test administered during Initial Survey (1994) (1)			Mid-Term Survey (1997) (2)			Difference	CR Value
		N	M%	SD	N	M%	SD	(2-1)	
Assam	Darrang	595	68.53	14.21	72	84.71	17. 50	16.18	7 49*
	Dhubri	580	78.37	12.86	99	78.42	21.50	0.05	0 02
	Morigaon	400	64.61	14.29	55	61.40	26.07	-3 21	-0 89
Haryana	Hissar	621	56.93	37.27	94	72.34	28.44	15.41	4.68*
	Jind	552	39.29	35 75	86	53.65	34.85	14.36	3.54*
	Kaithal	665	58 64	36 70	78	80 68	24.88	22.04	6.98*
	Sirsa	593	47.38	28.67	94	72.49	27.77	25 11	8.12*
Karnataka	Belgaum	714	62.40	31.97	69	89.24	9.79	26.84	15.88*
	Kolar	586	40.52	29.95	50	83.47	10.50	42.95	22.07*
	Mandya	587	46.23	28.91	30	83.78	10.07	37.55	16.90*
	Raichur	613	50.40	33.45	5	82.39	3.86	31.99	13.58*
Kerala	Kasargod	722	66.43	33.14	85	71.21	16.55	4.78	2.18*
	Malappuram	794	54.29	29.29	96	75.90	17.70	21.61	10.31*
	Wayanad	714	58.87	30.00	82	48.00	16 80	-10.87	-4.99*
Madhya Pradesh	Chattarpur	366	25.80	18.50	68	51.00	7.14	25.20	19 34*
	Panna	273	26.40	15.93	44	40 00	4.29	13.60	11.66*
	Rewa	511	43.80	17.79	81	49.23	15 00	5.43	2.93*
	Satna	451	26.90	16.93	90	40.47	22.79	13.57	5.33*
	Sidhi	475	33.30	17.29	49	30.51	4.29	-2.79	-2.77*
	Tikamgarh	372	33.70	19.57	54	27.95	18.57	-5.75	-2.09*
	Bilaspur	670	54.10	15 93	64	72.56	15 43	18.46	9.05*
	Rajnand gaon	612	54.60	16.00	54	59.28	30.00	4.68	1.12
	Raigarh	316	54.80	16.57	69	39.30	22.86	-15.50	-5.30*
	Surguja	207	35.50	15.71	43	52.30	33.57	16.80	3.19*
	Shahdol	361	35.20	17.43	34	48.88	20.72	13 68	3.68*
	Betul	583	45.20	17 86	83	29.37	15.00	-15.83	-8 72*
	Dhar	471	43.60	17.14	63	27 22	20.71	-16.83	-5.96*
	Guna	414	44.20	19 29	55	54.49	24.29	10.29	2.99*

State	District	BAS test administered during Initial Survey (1994) (1)			Mid-Term Survey (1997) (2)			Difference	CR Value
		N	M%	SD	N	M%	SD	(2-1)	
	Mandsaur	479	42.30	15 00	69	50.22	19.29	7.92	3.25*
	Rajgarh	368	55.50	22.14	68	57.00	25.00	1.50	0 46
	Raisen	370	44.70	17 86	47	64.00	12.14	19.30	9.57*
	Ratlam	497	53 50	19.29	78	67.00	10.00	13 50	9.43*
	Sehore	445	55.00	18 57	60	38.00	7.14	-17.00	-13 27*
Maharashtra	Aurangabad	674	47.71	33.64	100	67.36	30.79	19 65	5.86*
	Latur	756	37.14	35.07	99	52.36	41.50	15.22	3.47*
	Nanded	634	42 29	34 43	88	72.86	32.12	30.57	8.25*
	Osmanabad	719	41.21	38.07	77	61.29	28.21	20.08	5.68*
	Parbhani	714	49.64	34 21	94	46.29	32.50	-3.35	-0.93
Tamil Nadu	Dharampuri	1574	35.29	26.86	100	56 93	29.77	21.64	6.78*
	Cuddallore	740	34.79	23.68	95	57.59	33.55	22.80	6.39*
	Thiruvanna-malai	542	30 64	24.14	83	62 39	27.05	31.75	10.03*
	Villupuram	—	34.79	23.68	91	78.41	26.07	43.62	15.12*

*$p<.05$

Of all the States, three States namely, Haryana, Karnataka and Tamil Nadu, formed a group wherein all the districts demonstrated significant improvement in mathematics achievement. In the rest of the States some of the districts which showed a downward performance failed to develop the basic competencies amongst the students. This might be partly attributed to the non-compatibility between the test contents based on the 1994 existing syllabi and the instructional material based on the 1997 revised syllabi. Those States and the districts which could succeed in developing basic competencies through DPEP interventions had demonstrated better performance than their counterparts.

Comparative Profile of Class III Students in Language on BAS 1994 with 1997

Table 7 shows a comparative profile of Class III students in language.

TABLE-7

Comparison of Achievement of Class III Students in Language on the BAS Test Administered during the Initial Survey and Mid-term Survey

		BAS test administered during							
		Initial Survey (1994) (1)			*Mid-Term Survey (1997) (2)*				*CR Value*
State	*District*	*N*	*M%*	*SD*	*N*	*M%*	*SD*	*(2-1)*	*Difference*
Assam	Darang	472	49.32	9.41	81	67.73	26.91	18.41	6.09*
	Dhubri	532	52.02	9.55	78	67.74	17.18	15.72	7.85*
	Morigaon	400	47.02	9.95	54	50.89	15.07	3.87	1.82
Karnataka	Belgaum	798	40.09	14.21	89	77.90	13.63	37.81	24.65*
	Kolar	550	31.70	14.07	48	59.30	12.15	27.60	14.77*
	Mandya	640	34.66	13.77	38	56.98	11.85	22.32	11.03*
	Raichur	580	36.23	16.45	38	58.33	12.00	22.10	10.60*
Kerala	Kasargod	977	45.28	18.40	110	56.82	16.08	11.54	7.00*
	Malappuram	1129	44.76	17.99	142	53.55	16.05	8.79	6.05*
	Wayanad	983	51.32	18.25	131	49.93	16.12	-1.39	-0.91
Maharashtra	Aurangabad	746	36.70	18.80	148	45.00	22.80	8.30	4.14*
	Latur	816	30.11	21.91	109	44.00	20.23	13.89	6.63*
	Nanded	610	37.11	22.11	111	35.25	21.93	-1.86	-0.82
	Osmanabad	842	30.66	24.00	129	42.55	15.95	11.89	7.27*
	Parbhani	790	39.07	16.48	111	47.20	23.70	8.13	3.48*

*p< .05

The statistics shown in Table 7 indicate that the performance of Class III students in language showed positive trends in 13 out of 15 districts, of these, 12 districts displayed significant improvement. Of these 12 districts, in two districts the hike in achievement ranged from 25-38 %, in 7 from 10-25 % and in the rest up to 10 per cent. The remaining two districts namely

Wayanad and Nanded showed a negative trend but not significant.

From the above discussion, it is clear that Morigaon from Assam, Wayanad from Kerala and Nanded from Maharashtra did not exhibit significant improvement in language achievement. One reason for this could be that the DPEP achievements did not produce the desired results in these three districts. Another factor that could be attributed to the "no-hike" situation would be the variation between the test contents developed in the year 1990 and the revised course contents being transacted in the year 1997. This goes to prove that in all those districts where the DPEP interventions were able to develop the basic competencies, language improvement made a significant stride but wherever there was no such compatibility, the results did not show significant improvement.

Comparative Profile of Class III Students in Mathematics on BAS 1994 with 1997

Table 8 specifies a comparative profile of Class III students in mathematics.

TABLE 8

Comparison of Achievement of Class III Students in Mathematics on the BAS Test Administered during the Initial Survey and Mid-term Survey

		BAS test administered during							
		Initial Survey (1994)			*Mid-Term Survey (1997)*				*CR Value*
State	*District*	*(1)*			*(2)*			*Difference*	
		N	*M%*	*SD*	*N*	*M%*	*SD*	*(2-1)*	
Assam	Darrang	472	51.87	17 30	81	54 82	20.90	2.95	1.20
	Dhubri	532	55 64	19.00	78	50 15	22.35	-5.49	-2 05*
	Morigaon	400	45.42	17.33	54	37 22	17.75	-8 20	-3.17*
Karnataka	Belgaum	798	46 25	21 93	89	75 07	14.75	28.82	16.44*
	Kolar	550	32 75	15.28	48	48 50	12.83	15.75	7.96*
	Mandya	640	39.50	15.38	38	40 83	11.25	1.33	0 68
	Raichur	580	38.00	22.65	38	55.51	18.68	17.51	5 45*

State	*District*	*Initial Survey (1994) (1)*			*Mid-Term Survey (1997) (2)*			*Difference*	*CR Value*
		N	*M%*	*SD*	*N*	*M%*	*SD*	*(2-1)*	
Kerala	Kasargod	977	38.42	14.63	110	48.35	15.03	9.93	6.56*
	Malappuram	1129	34.10	13.58	142	43.28	15.80	9.18	6.60*
	Wayanad	983	39 60	13.77	131	35 85	13.18	-3.75	-3.02*
Maharashtra	Aurangabad	746	27.20	19.51	148	39 93	21.70	12.73	6.60*
	Latur	816	25.48	14.68	109	35.17	17.15	9.69	5 61*
	Nanded	610	29 50	17 23	111	28 88	17.03	-0 62	-0.35
	Osmanabad	842	25 43	15.50	129	35 83	13.23	10.40	8 10*
	Parbhani	790	30.73	13 87	111	44 88	24.53	14.15	5 92*

p<.05

The figures displayed in Table 8 reveal that 11 out of 15 districts exhibited positive trends in mathematics achievement; of these, 9 districts showed significant improvement. In six out of nine districts, the hike in achievement ranged from 10 to 28.82 % and in the remaining three up to 10 per cent There are three districts, of them, two in Assam and one in Kerala, where students' performance in mathematics showed a significant decline. Interestingly, almost all those districts which did not register significant improvement in language also did not display significant improvement in mathematics. The reasons stand to be the same as indicated above in the case of the summing up of the language achievement.

Comparative Profile of Class IV Students in Language on BAS 1994 with 1997

Table 9 depicts a comparative profile of Class IV students in language.

The data posted in Table 9 illustrates that 18 out of 27 districts demonstrated positive trends; of these, 15 portrayed significant improvement in language achievement in Class IV in the States of Haryana, Tamil Nadu and Madhya Pradesh. In seven districts, the hike in achievement ranged from 10-21 % and in the

TABLE 9

Comparison of Achievement of Class IV Students in Language on the BAS Test Administered during the Initial Survey and Mid-term Survey

State	District	*BAS test administered during* *Initial Survey (1994) (1)* N	M%	SD	*Mid-Term Survey (1997) (2)* N	M%	SD	*Difference (2-1)*	*CR Value*
Assam	Darrang	472	51.87	17.30	81	54.82	20.90	2.95	1.20
Haryana	Hissar	593	41.99	18 14	130	37.77	14.95	-4.29	-2.78*
	Jind	717	46.33	15 77	100	41.21	12.03	-5.12	-3.80*
	Kaithal	651	46.42	16 55	86	54.01	22 00	7.59	3 06*
	Sirsa	555	41.15	16.28	112	61.27	19.50	20.12	10.19
Madhya Pradesh	Chattarpur	398	29.70	8.57	42	37 17	1.19	7.47	15.94*
	Panna	280	25.00	8.17	36	41.56	3.45	16.56	21.76*
	Rewa	588	33.50	9.40	78	32.78	3.21	-0 72	-1.35
	Satna	478	21.10	7.81	71	27.29	4.15	6 19	10.12*
	Sidhi	386	38.20	5.27	42	30 48	14.76	-7.72	-3.33*
	Tikamgarh	399	27.90	8.57	60	32.20	2.86	4.30	7.56*
	Bilaspur	807	40.20	6 79	44	55 11	4.29	14.91	21.41*
	Rajnand gaon	609	38.60	9.01	60	39.50	3 33	0.90	1.59
	Raigarh	299	43.20	7.63	70	36.24	3.45	-6 96	-11.48*
	Surguja	311	37 90	8.45	46	45.69	4.08	7 79	10.05*
	Shahdol	406	33 50	8.71	50	24.90	3 99	-8.60	-9 52*
	Betul	714	39.50	10.24	106	36.00	5.00	-3.50	-5.64*
	Dhar	499	32.40	10.24	53	45.00	10.71	12.60	8.11*
	Guna	403	32.50	10.24	30	35.00	5.00	2.50	2.36*
	Mandsaur	539	27.50	9.76	63	38 00	4.29	10.50	15.25*
	Rajgarh	342	34.30	11 07	65	27.00	4.88	-7.30	-8.54*
	Raisen	389	36.30	10.36	52	53.00	9.17	16.70	12.04*
	Ratlam	428	35..70	8.69	51	36.00	8.52	0.30	0.21
	Sehore	496	31.70	10.24	76	26 58	3.33	-5.12	-8.54*
Tamil Nadu	Dharampuri	692	38.47	11 23	150	46.41	17.52	7 94	5.32*
	Cuddallore	961	36.50	12.68	84	43.62	14.53	7.12	4.34*
	Thiruvanna-malai	644	33.73	14.39	96	36.23	12.93	2.50	1.73
	Villupuram	—	36.50	12 68	147	57.30	20 34	20.80	12 03*

*p<.05

remaining districts up to 10 per cent. Two districts in Haryana and six in Madhya Pradesh, however, displayed significant decline in achievement. Besides, there was one more district in Madhya Pradesh where the trend was negative but not significant.

The significant decline in language achievement might be attributed to the non-compatibility between the test content developed in the year 1990 and the revised course content transacted in the year 1997. This effect seemed to have multiplied as a consequence of the DPEP interventions in all those districts that showed significant increase in language achievement. Districts showing significant increase seemed to have developed the basic competencies to such a level amongst the students, where they were able to tackle any kind of test items related to curriculum-relevant competencies.

Comparative Profile of Class IV Students in Mathematics on BAS 1994 with 1997

Table 10 illustrates a comparative profile of Class IV students in Mathematics.

TABLE 10

Comparison of Achievement of Class IV Students in Mathematics on the BAS Test Administrated during the Initial Survey and Mid-term Survey

State	*District*	*BAS test administered during Initial Survey (1994) (1)*			*Mid-Term Survey (1997) (2)*				*CR Value Difference*
		N	*M%*	*SD*	*N*	*M%*	*SD*	*(2-1)*	
Haryana	Hissar	593	38.15	13 98	130	41.57	24.58	3.42	1 53
	Jind	717	39.55	13.25	100	28.95	11.50	-10.60	-8.48*
	Kaithal	651	39.13	13.00	86	43.47	16.54	4 34	2.33*
	Sirsa	555	34.65	12.28	112	54.14	20.06	19.49	9.89*
Madhya Pradesh	Chattarpur	398	26.10	10.23	42	35.00	9.00	8.90	5.95*
	Panna	280	22.20	12.68	36	25.61	9.00	3.41	2.01*
	Rewa	588	27.10	13.00	78	25.28	9.00	-1.82	-1.57
	Satna	478	17.50	11.58	71	22.12	4.13	4.62	6.38*

State	District	BAS test administered during: Initial Survey (1994) (1) N	M%	SD	Mid-Term Survey (1997) (2) N	M%	SD	CR Value Difference (2-1)	
	Sidhi	386	29.10	13.25	42	22.76	11.00	-6.34	-3.43*
	Tikamgarh	399	27.40	11.03	60	30.80	6.25	3.40	3.46*
	Bilaspur	807	31.50	14.25	44	38.63	8.50	7.13	5.13*
	Rajnand-gaon	609	29.30	10.93	60	22.47	7.75	-6.83	-6.20*
	Raigarh	299	32.20	10.50	70	30.86	9.75	-1.34	-1.01
	Surguja	311	25.10	11.45	46	29.38	6.25	4.28	3.77*
	Shahdol	406	26.50	11.25	50	18.05	7.75	-8.45	-6.81*
	Betul	714	34.30	14.25	106	25.00	6.00	-9.30	-11.74*
	Dhar	499	29.20	12.00	53	42.00	3.25	12.80	18.24*
	Guna	403	37.50	12.13	30	25.00	11.75	-12.50	-5.52*
	Mandsaur	539	26.10	13.25	63	27.00	3.25	0.90	1.28
	Rajgarh	342	30.20	15.75	65	32.00	9.25	1.80	1.25
	Raisen	389	30.30	15.75	52	37.00	4.93	6.70	6.34*
	Ratlam	428	28.40	10.00	51	30.00	3.50	1.60	2.31*
	Sehore	496	28.70	10.50	76	25.00	5.50	-3.70	-4.12*
Tamil Nadu	Dharampuri	692	28.18	9.71	150	38.15	17.71	9.97	6.66*
	Cuddallore	961	27.67	12.17	84	41.70	25.41	14.03	5.02*
	Thiruvanna-malai	644	28.83	12.27	96	30.94	13.07	2.11	1.49
	Villupuram	—	27.67	12.17	147	51.41	23.84	23.74	11.82*

*$p < .05$

The figures placed in Table 10 outline that 18 out of 27 districts demonstrated positive trends; of these, 14 districts displayed significant improvement in mathematics achievement in the States of Haryana, Tamil Nadu and Madhya Pradesh. The hike in achievement was found to be from 10-24 % in four districts and up to 10 in the remaining districts. Two districts in Madhya Pradesh showed marginal decline which, however, was not found to be significant. It was only Jind in Haryana and six more districts in Madhya Pradesh which exhibited significant decline in mathematics achievement. Interestingly, almost all those districts which displayed a significant hike in language

achievement also exhibited a similar level of performance in mathematics achievement. The reasons for the dismal performance in the aforesaid districts stand to be the same as indicated earlier in the case of the language achievement.

An overview of the comparative profile of students' achievement on BAS 1994 vs. 1997 indicating hike in achievement in both the subjects across Classes I, III and IV are presented in Table 11 and 12.

TABLE 11

Districts Claiming Hike in Achievement in Language - BAS Test 1994 vs. 1997

Class	*Total Districts*	*Districts Claiming Hike*				*Districts with Significant Hike*
		>25%	10-25%	<10%	Total	
I	42	6	10	12	28	19
III	15	2	7	4	13	12
IV	27	0	7	11	18	15

TABLE 12

Districts Claiming Hike in Achievement in Mathematics - BAS Test 1994 vs. 1997

Class	*Total Districts*	*Districts Claiming Hike*				*Districts with Significant Hike*
		>25%	10-25%	<10%	Total	
I	42	9	18	6	33	30
III	15	1	5	5	11	9
IV	27	0	4	14	18	14

Genderwise Differences in Achievement on MAS Tests

A detailed analysis of the data was carried out with a view to ascertaining genderwise differences in achievement on MAS tests in respect of Classes I, III and IV.

Table 13 shows the number of districts that have claimed the DPEP goal of reducing the genderwise differences to less than five per cent.

TABLE 13

Districts Claiming DPEP Goal in Regard to Gender

Class	*Total Districts*	*Districts Claiming DPEP Goal*	
		Language	*Mathematics*
I	42	40	31
III	15	14	15
IV	27	24	25

The results reveal that the DPEP goal of reducing the achievement gaps to less than five per cent between boys and girls in language in Class I has been attained in 40 out of 42 districts, and in mathematics in 31 out of 42 districts across seven States. In the remaining districts greater attention is required to attain the DPEP goal in its entirety.

The findings in respect of genderwise differences in achievement in language in Class III signify that the DPEP goal of reducing the achievement gaps has been accomplished in 14 out 15 districts in four States. Of the four States, Assam, Maharashtra and Kerala are the three States wherein the DPEP goal has been achieved in totality. In case of mathematics, the DPEP goal of reducing the achievement gaps between Class III boys and girls has been overcome in all the 15 districts

The discussion in regard to genderwise differences in achievement in Class IV signifies that the DPEP goal of reducing the achievement gaps between boys and girls has been completely fulfilled in all the districts of Haryana and Tamil Nadu while in Madhya Pradesh it has been realised in 16 districts in language and 17 in mathematics out of a total of 19 districts.

Areawise Differences in Achievement on MAS Tests

Table 14 illustrates the number of districts that have claimed the DPEP goal of reducing the areawise differences to less than five per cent.

TABLE 14

Districts Claiming DPEP Goal in Regard to Area

Class	Total Districts	Districts Claiming DPEP Goal	
		Language	*Mathematics*
I	42	20	16
III	15	4	5
IV	27	22	18

The analysis of results reveals that the DPEP goal of reducing the achievement gaps between urban and rural students in language in Class I has been attained only in twenty out of forty two districts in seven States The remaining districts have still to bring down the differences in achievement to less than five per cent. Of all the seven States, Tamil Nadu is the only State wherein all the districts have realised the DPEP goal in language in Class I. Areawise differences in achievement in language have favoured the rural students in two districts, one each in Maharashtra and Kerala. In mathematics, 30 out of 42 districts have shown significant differences in achievement In all, 16 out of 42 districts have achieved the DPEP goal of reducing the differences to less than five per cent. There have been three districts, namely, Aurangabad in Maharashtra, Dharmapuri in Tamil Nadu and Sidhi in M P., where the differences in achievement have favoured rural students.

The analysis of results in respect of areawise differences in achievement in language in Class III signify that although significant differences have been observed in thirteen out of fifteen districts, there have been two districts in the lot where these differences are under the ceiling of the DPEP. It shows that the DPEP goal has been achieved in 4 out of 15 districts. There are three districts, Darrang and Morigaon in Assam and Aurangabad in Maharashtra, where the differences in achievement find favour with the rural students. In mathematics in Class III, the situation has been slightly different. Whereas significant differences have been observed in 13 out of 15 districts, there are three districts out of the lot of 13 which have been well within the goal of the DPEP. Of the thirteen districts, there have been two districts in Assam and one each in Karnataka, Kerala and Maharashtra

where the differences in achievement find favour with the rural students. It is, therefore, evident that the goal of the DPEP has been realised by five out of fifteen districts.

The analysis of results in respect of areawise differences in achievement in language in Class IV signify that although one half of the total number of districts both in the States of Haryana and Tamil Nadu have shown significant differences, even these differences have been found to be under the ceiling of the DPEP. In Madhya Pradesh, out of 15 districts that have shown significant differences, in ten districts these differences have been found to be less than five per cent. . Thus, all the districts of Haryana and Tamil Nadu and 14 out of 19 districts of Madhya Pradesh have reached the DPEP goal. In mathematics the situation has been slightly different. The differences in achievement in mathematics have been found significant in three districts in Haryana, one in Tamil Nadu and eleven in Madhya Pradesh. Of these districts, achievement differences in one district in Haryana and four in M.P. have favoured rural students. It indicates that the DPEP goal of reducing the areawise differences in mathematics to less than five per cent has been realised in one district in Haryana, three in Tamil Nadu and fourteen districts in Madhya Pradesh.

Differences in Achievement Among Social Groups

Table 15 expresses the number of districts that have claimed the DPEP goal of reducing the categorywise differences to less than five percent.

TABLE-15

Districts claiming DPEP goal in regard to categories

Class	*Total Districts*	*Districts claiming DPEP goal*			
		Language		*Mathematics*	
		SC vs. Others	*ST vs. Others*	*SC vs. Others*	*ST vs. Others*
I	42	21	17*	22	15*
III	15	13	9	13	11
IV	27	23	14	19	11

* out of 31 districts

The analysis of data reveals that the DPEP goal of reducing the differences in achievement between SC and others and between ST and others in Class I in language have been realised in 21 out of 42 districts in seven States and in 17 out of 31 districts in four States, respectively. The remaining districts have still to reach the level of the DPEP goal. Of all the states, Maharashtra is one such State where differences in achievement in language in Class I cease to exist across the social groups except in Latur, and that too between SC and others. In mathematics, it is evident from the results that the goal of the DPEP have been realised in 22 out of 42 districts by reducing the differences between SC and others and in 15 out of 31 districts in four States by reducing the achievement gaps between ST and others. In Assam these differences between SC and others cease to exist in all the districts.

The analysis of results in respect of categorywise differences in achievement in language in Class III reveal that the goal of the DPEP has been achieved in 13 out of 15 districts in so far as the differences between SC and others and in 9 out of 15 between ST and others, are concerned. Of the four States, the State of Maharashtra appears to have gained an edge over other States in reducing the achievement differences across social groups. In mathematics achievement in Class III, 13 out of 15 districts have succeeded in realising the goal of the DPEP by reducing the differences in achievement between SC and others, and 11 districts in reducing it between ST and others. Of all the States, Kerala has got the singular distinction of realising the DPEP goal across the social groups.

The discussion in regard to categorywise differences in achievement in Class IV in language signify that all the eight districts in the States of Haryana and Tamil Nadu and 15 districts in Madhya Pradesh have overcome the goal of the DPEP by reducing these differences between SC and others, and two districts in Haryana, one in Tamil Nadu and eleven in Madhya Pradesh have reached the DPEP goal by reducing these differences between ST and others. In mathematics the differences in achievement in Class IV between SC and others cease to exist in 19 out of 27 districts, and in 11 districts between ST and others.

Influence of Intervening Variables on Students' Performance

The data were also analysed for the purposes of studying the influence of intervening variables on students' performance such as qualifications of parents, language used at home and the medium of instructions at school, availability of competency-based teaching-learning material and teacher-training.

Influence of Parental Qualifications

The findings of the study reveal that in the State of Assam in Darrang district the influence of parental qualifications on students' achievement in both the subjects turned out to be positive. While the district of Dhubri exhibited mixed results, Morigaon showed a decline. In the State of Karnataka, it is only in the district of Raichur where positive effects of parental qualifications on students' achievement both in language and mathematics had emerged. The remaining three districts demonstrated mixed results. In all the three districts of Kerala increase in parental qualifications had demonstrated an increase in the achievement level of students in both the subjects. In Maharashtra, with the exception of Aurangabad the parental qualifications in the remaining four districts seemed to have a positive influence on students' achievement in both the subjects. The State of Haryana demonstrated mixed results with more number of positive cases of parental qualifications influencing students' achievement in both the subjects. Like Haryana, Tamil Nadu also displayed mixed results where, in a large number of cases, the parental qualifications tended to make a positive influence on students' achievement in both the subjects.

Influence of Language Used at Home vs. School on Students' Achievement

It is not necessary that the language spoken at home is the same as that of the medium of instruction at school. There are certain pockets in the country where the language at home differs from the language at school. Whether these differences results in any gains or loses were studied. The analysis of data reveals that in the State of Assam the performance of those students who had

the same language both at home and at school was found to be more significant than that of their counterpart both in mathematics and language in Darrang; only in mathematics in Dhubri; and in language in Morigaon. In the rest of the cases the differences were not found to be significant. In the State of Karnataka these differences were found to be significant only in the district of Belgaum in both subjects. In the remaining three districts, these differences were not found to be significant. In Kerala, no significant differences were observed in all the three districts except in mathematics in Kasargod. These differences were found to be significant only in two out of ten cases in Maharashtra, two out of eight cases in Haryana and one out of eight cases in Tamil Nadu. Apparently, the difference between the language spoken at home and at school failed to produce any remarkable change in students' achievement in both subjects as is evident in 18 out of 22 cases in language and in 14 out of 22 cases in mathematics, where the differences in achievement did not turn out to be significant. Not only this; even in those cases where the differences were found to be significant, the differences in achievement found favour with students using different language at home than the language used at school in two out of four districts in language and three out of eight districts in mathematics.

Influence of the Availability of Competency-Based Teaching-Learning Materials on Students' Achievement

The availability of competency-based teaching-learning materials to more and more schools is expected to produce desirable improvement in students' performance. Analysis of data on this count reveals that whichever districts had the maximum number of schools holding the complete range of competency-based teaching-learning materials, the better was their performance. It is evident that in Kolar in Karnataka, Waynad in Kerala, Jind in Haryana and Thiruvannamalai in Tamil Nadu, where the least number of schools had competency-based teaching-learning material, the performance of the students turned out to be lower as compared to other districts. In Madhya Pradesh, the picture is slightly different. Eleven out of 19 districts in the State of Madhya Pradesh had textbooks but no workbook for their

students. On the other hand there were examples of six districts which had the workbooks but no textbooks available. Raisen was the only district where all types of teaching-learning material was available resulting in good performance of its Class I students.

In-service Training

It is evident from the data that of the 42 districts, all the sampled urban teachers from 11 districts had received in-service training during the past three years; three districts were from Kerala, two each from Assam and Tamil Nadu, one from Haryana and three from Madhya Pradesh Significantly, all the five districts from Maharashtra, all districts of Karnataka, three districts in Haryana, one in Assam and 16 in Madhya Pradesh reported a number of untrained teachers. However, in seven districts the number of teachers without in-service training was found to be insignificant.

In the rural sector, all the teachers had received some kind of in-service training in seven districts only, namely, Osmanabad in Maharashtra, Kaithal and Sirsa in Haryana , Kolar in Karnataka, Dharmapuri in Tamil Nadu and Bilaspur and Rajnandgaon in Madhya Pradesh. In 17 out of the remaining 35 districts, it was observed that more than 90% of the sampled teachers had received in-service training. It was in 18 out of 42 districts that the number of untrained teachers was worth significant notice.

Influence of In-service Training

Analysis of data reveals that in language teaching there was an incremental impact in all the districts of Karnataka, Maharashtra, Haryana, Tamil Nadu and in two out of three districts in Kerala and in 12 out of 19 districts in Madhya Pradesh , Marginal impact was observed in all the districts of Assam, in Kasargod in Kerala and in 6 districts in Madhya Pradesh, In mathematics teaching, in-service training seemed to have an incremental impact in all the districts of Karnataka, Tamil Nadu, Maharashtra, in one district each in Kerala and Assam, in three out of four districts in Haryana and in 11 out of 19 districts in Madhya Pradesh.

Marginal impact of in-service training was observed in two districts each in Kerala Assam, in one district in Haryana and in six districts in Madhya Pradesh.

Implications

The analysis of results pertaining to average performance of students on the newly generated competency-based achievement tests under MAS across subjects, classes, districts and States confirms the pre-eminence of the element of contextuality. This warrants further research focussing on the dilemmas of individual districts and offering of local specific solutions and possibilities.

Examination of the average performance of Class I students on MAS tests in language and mathematics suggests that those districts where the achievement level has crossed the 80% mark, continued efforts may be carried through to sustain the tempo of progress. In those districts where the achievement level is below 80% but above 60%, focussed attention may be directed so as to boost the achievement to the level of mastery. And, in those districts where the achievement level is below 60%, the hard spots of learning may be identified and remedial programmes may be organised rigorously in order to escalate the achievement level to the level of mastery.

Scrutiny of the average performance of Class III and Class IV students on MAS-1997 tests, both in language and mathematics, across the States of Assam, Kerala, Karnataka, Maharashtra, Haryana, Tamil Nadu and Madhya Pradesh warrants an immediate action plan that provides for a multipronged strategy. The data from all the low performing districts may be thoroughly re-analysed to identify the hard spots of learning and corrective measures may be devised on the basis of the subjectwise and districtwise analysis to realise the desired results. Besides, the quality of the instructional materials and the in-service training programme that are in vogue may also be subjected to a thorough review.

Analysis of results reveals that the students' performance in Class I on MAS tests, both in language and mathematics, has been relatively superior to the performance exhibited by students of Classes III and

IV. The superior results in Class I may be attributed to the faster pace of the pedagogical renewal processes in Class I than in Classes III and IV. It calls for focussed attention on the implementation of research-based interventions in Classes III and IV.

Comparative assessment of students' achievement in Classes I, III and IV in both the subjects on the tests used in 1994 and re-administered in 1997 reveals spectacular results in Class I in a large number of districts, whereas in Classes III and IV the results are either moderate or not very encouraging. In those districts where the hike in students' achievement is found to be exceptionally outstanding, intervention efforts may be continued to sustain the gains. For districts showing moderate but positive trends, intervention efforts may be stepped up to raise the level of students' achievement through intensive coaching and cooperative learning, whereas in the case of districts where a decline in performance is discernible, spirited intervention efforts may be made in the direction of rejuvenating the system not only by undertaking the exercise of re-analysis of their data but also by introducing research-based interventions. For such districts the success stories of districts showing remarkable results may also provide an impetus for building the basic competencies amongst their students to such a level where they become competent to handle any kind of test items related to the competencies laid down in their curriculum.

On examining the results pertaining to differences in achievement in language and mathematics in Classes I, III and IV as regards gender, it is revealed that in almost all the districts the gender bias has been removed. This cautions that while taking measures to increase the levels of students' achievement, special care may be taken to maintain the present balance in gender. Where the differences in achievement across the social groups still persist beyond the DPEP goal, special attention may be paid to the students from underprivileged sections of the society. This may be done up in a variety of ways like extra drills, supervised study programmes, proliferation of local-specific instructional materials and purposeful reinforcement and motivation.

The assessment of the influence of parental qualifications on the achievement of students of the penultimate classes in both the subjects reveals an incremental influence in most of the cases.

Although parental qualifications have proved to have a positive influence on students' achievement, any kind of acceleration in the parental qualifications may be shouldered by the State governments.

On studying the influence on students' achievement caused by differences between the language used at home and the medium of instruction at school, it is observed that it does not have any adverse effect. This is a pointer that duplication of efforts may be avoided in so far as the preparation of differential resource material is concerned.

Analysis of the influence of the availability of competency-based teaching-learning material on students' achievement signifies that it stands positively related This implies that the DPEP interventions may ensure that all the schools are equipped with the competency-based teaching-learning materials.

Review of the in-service training reveals that barring Kerala, a large number of districts have a substantial number of urban and rural teachers who have not undergone any in-service training during the past three years This calls for refocussing on the in-service training programmes. All the teachers employed in primary institutions, both in urban and rural sectors, may be provided with recurrent, need-based and district-specific training.

The executives responsible for the implementation of the programme at the State level may organise sharing-workshops to disseminate the findings and implications of the study and to deliberate upon the ensuing directions that the interventions may take in future. Besides, the findings of the study may be related to the data available at various levels.

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4

Problems and Prospects of Double Shift Schools: A Study of Assam and Madhya Pradesh

Sunil Batra

The study was conducted to identify and ascertain the nature of shift schooling. It also explored the economic, educational and social implications of running shift schools, including the potentital of running such schools. The study was based on in-depth analysis of 31 double shift schools and 15 single shift schools from the States of Assam and Madhya Pradesh. Both qualitative and quantitative research techniques like checklist, structured interviews, observation, group discussion and documentations of case studies were used for the collection of data. The findings revealed that the emergence of double shift schools was due to increase in enrolment and shortage of teachers. The practice of shift schooling.also failed to take full advantage of the potential possibilities of cost saving. The findings also indicated that teachers, the most expensive resource, were not shared between the two shifts Double shift schools also witnessed reduced learning time for the students in terms of both formal instruction and informal interaction with peers. Further, a comparative analysis between shift and non-shift schools revelaed no differences in the quality of service, attendance and achievement level.

Introduction

Of the 150 million children enrolled in India's elementary schools, about 109 73 million were enrolled in 5,90,421 primary schools in the year 1995-96. The number of teachers employed in primary schools was about 1.74 million for the same year (MHRD, 1997). From these figures, it appears that till 1996, the average number of children and teachers for every school was 186 and 3, respectively. In other words, the average number of children for every teacher was 62.

National averages can often be misleading. While some parts of the country have a lower teacher-pupil ratio than the national average, there are many schools where the ratio is overwhelmingly high, where classroom teaching becomes complex and unwieldy. With initiatives such as the District Primary Education Programme, the Total Literacy Campaigns and alternative schooling programmes, more families across the country would inevitably be motivated to seek admission for their children in primary schools, resulting in a further increase in enrolment rates. It thus becomes imperative upon the public policy initiatives to seek cost-saving mechanisms.

The pressure on the school system is felt more in areas with large populations where existing schools cannot accommodate the increase in enrolment. This phenomena would, no doubt, also dramatically increase pressures on the allocation of resources. The cost of providing for increase in enrolments is compounded by the fact that school buildings and facilities are inadequately equipped to meet the needs of even those who are already enrolled. Further, research studies have also established connections between poor attendance and ramshackle conditions of school buildings and facilities (Banerjee and Jha, 1997). Poor infrastructure and lack of facilities can, no doubt, lead to poor retention.

Inadequacy of physical premises is often also compounded by shortfall in allocation of teachers. In Dhubri in Assam, for instance, for a ratio of 1:45 per classroom, there is a shortage of about 1900 teachers (Banerjee and Jha, 1997). In situations where the ratio is unreasonably high, teachers either reduce the overall teaching time for different classes or teach two or three

classes of different grades at one time To meet the situation of overcrowding and inadequate infrastructure facilities, several schools have initiated running two shifts in the same premises. For developing countries, multi or double shift schooling may help address some basic cost issues such as the use of existing premises and resources.

In addition, double shift schools can also provide alternatives to problems related to inadequate allocation of teachers and multigrade teaching.

The implications of running two or more shifts in one premises may be diverse and have a long-term impact. For instance, can shift schooling emerge as a viable solution to the pressure on admissions? What kind of situations can shift schooling function in? Although found all over the world, there is very little literature available on shift schooling, particularly in India. To address this gap, the Centre for Education, Action and Research was commissioned to undertake a research study by the MHRD, Government of India

Trends in Multi-Shift Schooling

Multi-shift or double shift schooling is found in countries as diverse as Mexico, Philippines, Botswana, USA, Singapore, Bangaladesh and India. In all cases, it presents a solution to the problem of increasing enrolments and shortage of resources. It appears to be particularly useful in developing countries that experience a fast-paced increase in population but slow- paced allocation and equitable distribution of resources.

Different countries have evolved their own models of shift schooling. These range from conducting one shift after another to operating overlapping shifts. The reasons for running multiple-shift schools in urban and rural areas are usually different. Scarcity of land and high density of population may be the most common reason in urban areas. In rural areas in poor countries, the sharing of building premises or inadequate allocation of teachers may warrant the need for shift schooling.

Whatever the origin or the arrangement, there are advantages and disadvantages to all kinds of shift systems And unless efficiently managed, shift schooling usually implies reduced

hours of teaching in many schools The degree may vary according to the shift arrangement and the commitment of the school authorities to not reduce formal contact hours for either shift.

In his book on multi-shift schooling, Mark Bray has provided brief outlines for the kinds of models of shift schooling found in different countries. These include

1. 'End-on' Shifts

Most multiple-shift schools are "end-on" shifts, wherein, the first group of students arrive in the early morning and leave at midday and the second group of students arrive at midday and stay till late in the afternoon. In some cases, a third shift may also be run by a local community organisation or an NGO. In Zambia, some schools are reported to conduct three shifts, one after the other.

Schools in Hong Kong are said to introduce shift schooling with variations in the length of the time attended by each school in a week In a double shift system, the schools have seven periods per day, Monday to Friday (instead of 8 periods a day) plus six periods on Saturday. Since the schools in Hong Kong operate only on alternate Saturdays, the approximate number of periods per week adds up to 38. If double shift schools were to work every Saturday, they would have more periods per week than single shift schools.

2. Overlapping Shifts

In some schools, students of different shifts arrive and leave at different times, but may be present at school at some time of the day together.

The operation of the shift was as follows:

Shift A: 9 periods per day, 8:15 am to 3:10 pm

Shift B: 9 periods per day, 9.35 am to 4.30 pm

Both shifts had the same lunch hour, from 12:10 to 1:10 p.m. This helped students of each shift to meet each other and to feel part of a single institution. The system required efficient time-

tabling but did not cause major problems (pp. 17, Bray, 1989).

A school in Philippines is reported to run four shifts in a single day The timetable in this school is complex but the school has successfully demonstrated that its building can be utilised non-stop from 7.00 am to 7.40 pm.

3. Different or Shared Teachers

A common image about shift schooling is that of a school that runs two shifts with the same set of teachers In some cases, two sets of teachers may be employed for two shifts. Relatively more affluent countries such as Singapore, South Korea (and parts of Nigeria) are better able to afford two sets of teachers. In poorer countries such as Senegal and India, two separate sets of teachers may prove to be quite expensive. In some situations, if the policy allows teachers to work extra classes for additional payment, some teachers may feel motivated to do so.

4. One Set of Buildings for Two Levels of Education

In Bangladesh, double shift schools accommodate Classes 1 and 2 in the morning and Classes 3,4 and 5 in the afternoon. In Puerto Rico, primary classes are taught in the morning and higher classes in the afternoon. In Malaysia, intermediate classes may be conducted in the first shift and senior secondary classes in the afternoon shift.

5. Day and Boarding Schools

Some countries are also known to use the school buildings of their boarding schools more effectively by organising a timetable whereby several hours of the day can be used for a shift which can accommodate day scholars For the boarders, some classes may be arranged in the evenings when it may be difficult for day scholars to attend school. Such an arrangement can also allow extensive use of laboratories, kitchens, play fields, etc. Sarawak State of Malayasia is said to conduct multiple schooling in its boarding schools.

6. Daily, Weekly and Monthly Rotation

Daily Rotation: one group of students attend school on Mondays, Wednesdays and Fridays and another group attends on

Tuesdays, Thursdays and Saturdays.

Weekly Rotation: One group of students attend school on Weeks 1 and 3, while another group attends on Weeks 2 and 4.

Monthly Rotation: One group of students attend school in January, March and May while another group may attend school in February, April and June.

The above variations of shift schooling are said to have been tried successfully in some schools in the USA. However, it has been noted that both schools and communities require radical reforms of the education system and a strong political will to implement such a system.

Owing to the preponderance of two shifts in shift schooling and for the purposes of this study, the author has chosen to refer to all kinds of multi-shift schooling as double shift schooling.

Double Shift Schools in Practice

The objectives of the study on the problems and prospects of double shift schools were to identify and ascertain the nature of shift schooling. It also sought to explore the economic, educational and social implications of shift schooling, including the potential of running shift schools. The study was envisaged to be empirical and purposive in nature. Therefore, primary data was collected from the schools. Four districts, Guwahati and Dhubri in Assam and Bhopal and Rajgarh in Madhya Pradesh, were identified in consultation with the DPEP bureau. It was decided that one of the two districts would be urban and non-beneficiaries of DPEP and the other rural and beneficiaries of DPEP. It was also decided that single shift schools that present potential double-shift-like situations should also be studied. In the field, all the schools were selected in consultation with the State Project Directors, State government officials and district-level functionaries. The study is based on an in-depth analysis of forty-six schools, which includes thirty-one double shift schools and fifteen single shift schools. The single shift schools were defined as schools that could warrant a shift-like arrangement either because of increase in enrolment or space limitation or shortage of teachers.

Different research tools were used to gather quantitative and qualitative data. A wide range of information was gathered through checklists, key informants, structured interviews, observations, group discussions and documentation of case studies.

Patterns of Double Shift Schools

Four distinct models of double shift schools have been identified in Madhya Pradesh and Assam. The two features that distinguish these models from each other are the different classes they provide services for and the managerial strategy used by the schools to run the two shifts

1. *Model I* : Some primary classes are being conducted in the morning and the remaining primary classes in the afternoon and the school is only till primary level. Ten such schools have been found in Assam (including all in Dhubri), two in Bhopal and one in Narsingarh.

   Shift I: Primary School (same): Classes I-III
   Shift II: Primary School (same): Classes IV-V

2. *Model II:* The primary school grew to accommodate middle classes or was during establishment a middle school. Here, primary classes are held in the morning and the middle classes are held in the afternoon. Eight such schools have been found in all: two in Bhopal, five in Narsingarh and one in Guwahati, but none in Dhubri.

   Shift I: Primary School: Classes I-V

   Shift II: Middle School: Classes VI-VIII

3. *Model III* : Two different primary or middle schools run in the same premises. Each school is a separate identity but both run in the same building, one in the morning and the other in the afternoon. In some cases, Shift I may be only primary and Shift II till middle level. Three such schools have been found in Bhopal and one in Narsingarh. One school which has a similar arrangement now (but was not originally designed so) is also found in Guwahati.

Shift I: Primary or Middle School . Classes I-V or I-VIII

Shift II: Primary or Middle School (different): Classes I-V or I-VIII

4 *Model IV* The school is up to Class X or XII but also runs primary classes in the morning and middle/secondary or senior secondary classes in the afternoon. Six such schools have been found in Madhya Pradesh; two in Bhopal, three in Narsingarh and one in Assam.

Shift I: Primary School: Classes I-V

Shift II. Middle, Secondary and/or Senior Secondary School. Classes VI-X/XII

Reasons for Starting the Double Shift Arrangement

1 The primary reason for starting a double shift school in almost all cases is increase in enrolment and shortage of space.

2 For sixty per cent of the schools, inaccessibility to a primary school within one kilometere was found to be a significant reason because of which shift schooling was started

3. All the schools operate 'end-on' shifts whereby the students of the second shift arrive at school only when the students of the first shift leave school. Therefore, none of the schools have felt the need to create any time-sharing plan between the two shifts.

4. As many as 84% of the sample schools utilise one set of buildings for two different levels of education; these include arrangements where the morning shift runs some or all primary classes and the afternoon shift runs different levels of primary classes, middle classes or senior secondary classes.

5 None of the schools, in either rural or urban areas, reported an arrangement where one or more teachers may be teaching more than one group of students on the same day.

6. Some schools also reported introduction of the shift arrangement because of either relocation, shortage of teachers, up-gradation and/or involvement of the VECs.

Procedures for Starting Double Shift Schools

In practice, for primary schools, permission to start a double shift school is required only at the block level. If the school is till the middle, secondary or senior secondary level, the office of the District Elementary Education Officer (DEEO) is expected to be involved. Official permission and the signature of the DEEO is required for this purpose.

In the schools, the Headmaster plays the most significant role in the decision-making but is usually guided by the senior teachers. In some cases, the teachers have performed an active role in initiating the shift arrangement. In the DPEP districts, in at least seven schools, the Village Education Committees (VECs) have been directly involved in approving the procedures for starting double shift schools

Issues Related to the Functioning of Double Shift Schools

With an increasing number of young children enrolling for primary education, it is not surprising to note that 42% of the double shift schools cater to the needs of the primary classes. The benefits of double shift schools may also be demonstrated in areas where middle schools are at such a considerable distance that these schools can help to make the transition from primary to middle classes more accessible for families. Similarly, in townships which have large school buildings, morning classes may be conducted separately for primary students only and afternoon classes for middle and senior students.

However, certain issues, specific to the practice of shift schooling require attention at the managerial and policy level. For instance, non-shift schools operate for at least six hours a day. In double shift schools, classes are conducted for a maximum of three-and-a-half hours for Shift I and four-and-a-half hours for Shift II. Since the same teachers do not teach both shifts, the actual teaching-learning time is reduced almost by half for Shift I and by less than half for Shift II (except in Bhopal where the morning shift runs for a longer duration). This problem is often compounded by the fact that both teachers and students often reach late for school, especially during the monsoons and the winter season.

The teacher-pupil ratio does not appear to have been reduced because of shift schooling and is especially unfavourable for the classes of Shift I. And reduced teaching time does not necessarily mean that the teachers in double shift schools organise their classrooms or instructional approaches any differently from teachers in single shift schools. In fact, Shift I in most double shift schools does not receive adequate supervision because many headmasters often reach school only at the time of the second shift.

Comparison Between Shift and Non-Shift Schools

It is perhaps believed that double shift schools may be in a position to provide better services and attention to their students. However, a comparison of data from shift and non-shift schools reveals that in actual practice shift schools are not any different or better than non-shift schools. For instance, multigrade teaching is being followed in at least 70% of the shift schools and 87% of the non-shift schools. Similarly, double shift schools are reported to have only marginally better provisions for infrastructure facilities. In most schools, the teaching-learning material is provided to shift schools only for the school as a unit and not to each separate shift. This often results in a bias against the classes of Shift I which do not get to use any of the material available in the school.

The average attendance of students in double shift schools is not significantly different from that in single shift schools. The average marks obtained by the students of Class IV is also more or less similar for both shift and non-shift schools. However, enrolment is reported to have improved in the double shift schools of Guwahati and Narsingarh in the year 1997-98 as shown in Table 1.

TABLE 1

Enrolment Figures for Double and Single Shift Schools for the Three Years with Percentage Increase

	1997-98	*1996-97*	*1995-96*
Double Shift Schools			
Narsingarh	277 (30%)	213(-0.5%)	214
Guwahati	391(22%)	321(10%)	293
Dhubri	306(5%)	291(5%)	278
Single Shift Schools			
Narsingarh	170(6%)	160(3%)	155
Guwahati	318(-7%)	342(5%)	327
Dhubri	305(6%)	289(5)	274

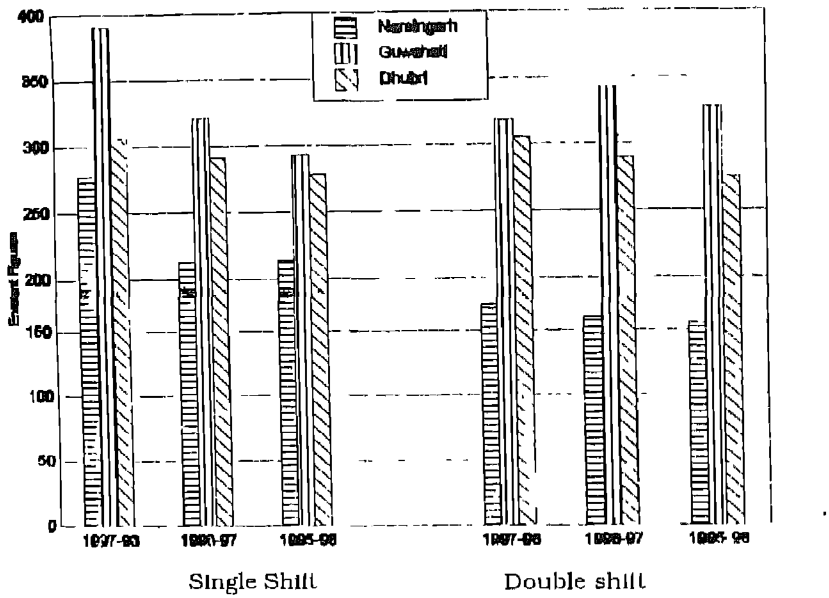


Fig.1 Enrolment Rates for Single and Double Shift Schools for Three Years

Perspectives

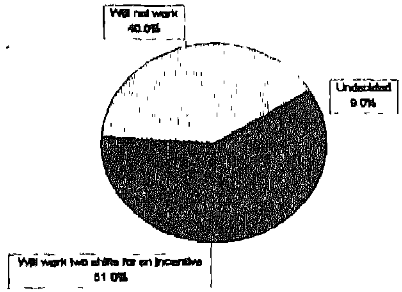
A relatively large number of headmasters, teachers and parents articulated that their schools continue to be adversely affected because of inadequate number of teachers and shortage of space The children tend to get neglected because of reduced teaching hours, especially during the monsoons and the winter season when they cannot reach school on time.

The teachers of double shift schools appear to be comfortable with their arrangements and only half said that they may work two shifts in a day provided they get an incentive. As many as 80% of these respondents also said that they would not be able to provide equal attention to both the shifts. Sixty-seven per cent

of the teachers of single shift schools said that they may work for two shifts if they receive incentives. Not surprisingly, headmasters of non-shift schools reported that teachers would like the shift system because it would mean reduced hours of

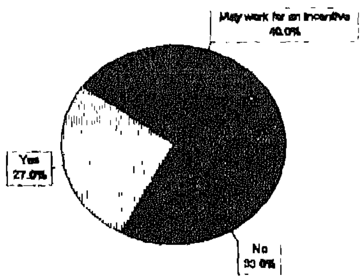
Teachers from double shift schools

who may work for two shifts



Teachers from single shift schools

who may work for two shifts



teaching. District and block level functionaries report that teachers may not be willing to teach both shifts in a double shift school.

The social convenience of double shift schooling does not appear to be as significant as it is popularly believed Close to 60% of

the parents said that they send their children to a double shift school because they do not have a choice. If they had a choice, about half the parents of both double and single shift schools would prefer to choose a single shift school for their children. Likewise, the students also said that they would prefer to attend a single shift school. Interestingly, the number of those who prefer a single shift was higher from Shift I than Shift II And only less than 10% of the students from both double and single shift schools said that they need to work outside the home for economic reasons and that shift schooling does not necessarily address their need for flexible timings.

Implications of Shift Schooling

The potential of operating shift schools as a mechanism to help save costs may be relevant. However, empirical evidence reveals that classrooms in many shift schools continue to be overcrowded. This may be due to the fact that while the shift system contributed to increase in enrolment, adequate number of teachers are not yet appointed in these schools.

In actual practice, teachers are underutilised in shift schools. They receive regular salaries like their counterparts in single shift schools but work for lesser number of hours. The shift system, as it is practised today, leads to reduced learning time for the students in terms of both formal instruction and informal interaction with peers, especially for students of Shift I, which in all shift schools consists of primary classes. Apart from improved access in two districts, the quality of service, attendance and achievement levels of the students are not significantly different from these in non-shift schools. The teachers appear to be the beneficiaries because for them it means attending school for lesser number of hours and being free for the rest of the day to attend to personal and other work.

The Future Prospects of Shift Schooling

Conceptually, double shift schools represent plausible savings on costs because of the utilisation of the same premises for two sets of students To achieve desirable standards of quality education, double shift schools, as they are practiced today,

will require closer scrutiny and monitoring. They may demonstrate the potential to improve access and teaching-learning conditions only if school activities are better planned, better managed and better monitored. This may be made possible in situations where:

1. Effective Learning Time Between Shift and Non-Shift Schools Must Not be Different

Shift schooling does not necessarily mean reduced teaching-learning time. Reduction in teaching time is usually inevitable in "end-on" shift patterns (of the kind that have been noticed in the four models described above). Creative planning of overlapping shifts can provide opportunities for children to attend school in two sets of timings without loss of school time Common activity areas can be used interchangeably or on Saturdays. Combined time can also provide opportunities for children to get the benefit of active peer interaction, usually denied in "end-on" shift schooling. In his book on Multiple Shift Schooling, Mark Bray cites interesting examples from experiments conducted in Indonesia, Malaysia and Hong Kong (1989).

2. Shift Schooling Must Not Reduce the Effectiveness of Classroom Interaction

Reduced formal teaching time can also mean opportunities to engage in group work before and after classes. With adequate monitoring, teachers can help students utilise time appropriately outside formal class hours for project work, library reading and remedial education. Under regular supervision, teachers may also be in a position to devote time for correction work and better preparation Similarly, possible pressures on teachers may be resolved through rotation of teachers or through incentives in the form of bonuses, increase in pay or provision for housing. All this can be made possible only with adequate supervision and appropriate educational support.

3. The Resources Available to the Local Administration and the School Must be Maximally Utilised

Shift schooling, as it is practised today, means tremendous loss in terms of teaches' salaries and underutilisation of existing

capacities. If savings on construction of buildings is reason enough to consider alterations in the school system, then adequate measures may be undertaken to ensure that gain in one area does not necessarily mean loss in the other Loss of formal learning time must be compensated through appropriate utilisation of the full capacity of the teachers in a school. Similarly, the material provided for play and learning in the school must be utilised through a creatively designed time-sharing plan. Such a plan must also incorporate loss because of wear and tear and demonstrate the benefits that may accrue in the achievement levels of the learners.

Early childhood education programmes could very well be integrated with shift schooling Such has been the case with several shift schools in Assam where the shift system has been introduced to cater to the increase in enrolment and include children below six years of age for organised schooling. With increasing funding and mobilisation of local resources for alternative schooling, shift schools may provide an opportunity for the same premises to be utilised for more than two sets of activities whereby the savings on buildings costs may be maximised. This may be made possible if alternative education programmes also receive direct community support through the Village Education Committees, which are increasingly expected to be involved with improvements in the quality of education.

Conclusion

The primary purpose of this research study was to ascertain the nature of shift schooling and consider the prospects for replication. The study has revealed that several issues emerge with the institutionalisation of shift schooling. Double shift schools have emerged as local solutions to locally felt problems The practice of shift schooling does not take full advantage of the potential possibilities of cost saving. The teacher resource, which accounts for the major share of recurring public expenditure, is not saved in the double shifts scools. If policy considerations are able to take into account the fact that the capacities and person-days of teachers do not remain underutilised, the viability of shift schools may tremendously increase Similarly, if effective learning time is not reduced in

shift schools, then levels of learning of students and the quality of education provided in the shift schools will be as good as that of the non-shift schools. Therefore, the viability of shift schools will depend on the extent to which the local school authorities are in a position to closely monitor the school processes such that effective learning time is ensured even when the schools are running on a shift basis.

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5

Para-Teachers: Their Role, Problems and Prospects

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The authors attempted to study the problems and prospects of para-teachers in varied contextual situations The five programmes, i.e., Siksha Karmi of Rajasthan, Alternative Schooling Programme, Education Guarantee Scheme, Shiksha Karmi Yojna of Madhya Pradesh and Volunteer Teacher Scheme of Himachal Pradesh, were identified for in-depth study. The findings of the study revealed that para-teachers failed to create a classroom climate of effective teaching The findings also showed that recruitment of para-teachers from the community facilitated the schooling process.

The study on Para-teachers: adopting the case study method, makes an in-depth probe into five programmes/schemes of alternative schooling involving para-teachers, covering all aspects viz., the socio-economic context, the community environment, village and school profiles, the children — their attitude and aspirations, teacher-community interaction, classroom culture and learning performance, with a focus on both the contents and the quality of the education being imparted in para-teacher schools. To provide a comparative perspective, regular schools and regular teachers, too, have been studied on similar lines.

By way of a background, the efforts at universalisation of elementary education in accordance with the constitutional

obligations and the hindrances in the process of achieving this objective, have also been taken into account. The reasons for alienating broad categories of masses from the educational processes — the colonial policies and their continuation, despite claims to the contrary— have also been dealth with.

The overall objective of the study being "to research the role, problems and prospects of para-teachers in order to be able to make policy recommendations at the national level with regard to their efficacy in the universalisation of elementary education", a broad spectrum of para-teachers, with varied contextual situations and working conditions under different schemes of alternative schooling, has been taken into consideration while selecting the sample.

The following programmes involving para-teachers were identified for in-depth study:

1.	Rajasthan:	*Shiksha Karmi* Programme
2.	Madhya Pradesh:	Alternative Schooling Programme
		Education Gurantee Scheme · Shiksha Karmi Yojna
3.	Himachal Pradesh:	Volunteer Teacher Scheme

A total of 32 para-teachers were included in the sample while 27 regular teachers were taken up from regular schools situated in the close proximity with the para-teacher schools Thus, in all, 59 teachers were covered for intensive investigations based on a comprehensive research design.

The data collected through field-work was analysed and interpreted at two levels. At one level case studies of each of the programmes were made with comprehensive treatment of each and every aspect affecting the role of para-teachers in a contextual framework. As carriers of rudiments of education to remote and inaccessible areas, to reach the unreached children living below poverty line, the role of para-teachers across the board was uniformly positive, and so also was their contribution in establishing a semblance of school-community and community-teacher relationship. Their low competence, however,

did not ensure quality in education and this again was a common feature despite the differing nature of the programmes under study. Beyond these, para-teachers working under different dispensations entertained different perspectives quite in conformity with their own socio-economic status and cultural moorings.

At another level, the analysis has been done with a general framework taking into account those variables which constitute a common thread running across all the programmes. The data in this context has been analysed by adopting a threefold methodology, wherein assumptions underlying given information have been tested on the anvil of reality observed by the investigators, in order to reach realistic findings.

Thus, the para-teachers have been dealt with in terms of their qualifications, characteristic features like their being local recruits, the voluntary nature of their work, the recruitment procedures, honorarium, etc. Assumptions characterising all these aspects and a realistic appraisal of the actual state of affairs as it emerged through clinical observations and the findings accruing from this dichotomy of assumptions and reality have been well brought out.

The Para-teacher

Minimum Educational Qualification and Other Conditions of Eligibility for the Position of Para-teacher

Educational qualifications

In four of the five programmes under study the minimum qualification required for a para-teacher is Matriculation (ASP, Madhya Pradesh and VTS, Himachal Pradesh) or Higher Secondary (EGS and Shiksha Karmi Yojna, Madhya Pradesh). In the Shiksha Karmi Programme, Rajasthan, it is Class VIII-pass.

Assumptions

The assumption is that a Matriculate or a Higher Secondary-pass person possesses the academic competence to teach primary classes, which is also the case in many other States.

However, the assumption held by the SK Programme of Rajasthan is that even a Class VIII-pass person can be prepared or developed into a competent primary school teacher over a four or five years by making available to him facilities for self-improvement and by providing him inputs through regular training and workshops. In the pre-service training he will be prepared to teach Classess I and II.

Reality

The quality of the transaction of the curriculum content improves as the qualification level of para-teachers rises. It was observed that Higher Secondary-pass para-teachers have a distinct edge over Class VIII-pass para-teachers. By and large, the transaction of academic content was poor in all cases but more so with para-teachers of lower qualification.

Conclusion

It is important that a para-teacher possesses the academic competence necessary for teaching the primary classes no matter what his/ her level of education is.

Localism

In four of the five programmes (Alternative Schooling Programme, Education Guarantee Scheme of Madhya Pradesh, Shiksha Karmi Project, Rajasthan, and Volunteer Teacher Scheme of Himachal Pradesh) a para-teacher has to be a local person

Assumptions

It is assumed that: (i) if a para-teacher is a local person belonging to the same community, where the school is opened, he/she will have "an emotional attachment with the community" and the community will also trust him/her (Shiksha Karma Project, Rajasthan); (ii) he/she will be punctual and regular in school and the problem of absenteeism of teachers will be solved; and (iii) he/she, being a local person, can help to realise the concept of ownership of the school by the community.

Reality

(i) In all the four programmes where a para-teachers has to be a local person, most of the para-teachers under the sample belonged to the same or close-by village/community; (ii) all the para-teacher schools even in remote areas were functioning with regularity almost in all the villages, (iii) community members spoke in favour of the para-teachers; (iv) the para-teacher being a local person functioned as a strong link between the school and the community and could involve the community in the affairs of the school to varying degrees in most of the places; (v) the community members felt that since the para-teacher is their person and speaks their language, he/she can explain things to children in their own language which would not be the case if the teacher were an outsider; and (vi) in a couple of places (VTS, Himachal Pradesh and SKP, Rajasthan) it was reported by the Centre Head Teacher and Block level officials that the para-teacher, being from the same village, tends to neglect school work in favour of personal work in the family and/or on family farms, especially in the peak agricultural seasons. However, it was also observed that the use of local language most of the time in the classroom hampers the child in learning Hindi. This is evident from the Class III Hindi tests

Conclusion

The advantages that accrue from the fact that the para-teacher is a local person speak for themselves. A teacher from outside would be working in an alien social environment with alien children and an alien community, which may not be conducive to UEE and an effective educational process.

Where para-teachers are recruited from amongst the same community, in which the school is located, and as most of the communities, where para-teacher schools are functioning, belong to the marginalised sections of the population, the para-teacher and the school occupy a distinct position symbolic of the progress and upliftment of the community itself.

Voluntarism

Para-teachers have been given different names by different

programmes like *Guruji* by the Education Guarantee Scheme (Madhya Pradesh), and Shiksha Karmi by the *Shiksha Karmi* Project (Rajasthan) and *Shiksha Karmi Yojna* (Madhya Pradesh). In Himachal Pradesh the scheme itself is called Volunteer Teacher Scheme and the teacher is called Volunteer Teacher (VT). Guruji points towards the teacher of the *gurukul* system in which a teacher did function as a volunteer The Shiksha Karmi Project of Rajasthan Explicitly says that the teacher in the Shiksha Karmi Project is a voluntary worker. He/she is not employed in any job and belongs to the project village. He/she is treated as an agent of change. Other para-teacher programmes may or may not have voluntarism as a basic feature in the conception of the programme, but SKP, Rajasthan has it.

Assumptions

The assumption of SKP, Rajasthan is that a para-teacher, who is a local youth and from the same community and therefore has emotional attachment to it, can work hard and with devotion and dedication if he/s/he fired with the spirit of voluntarism and *Sewa Bhava*.

Reality

Of the 11 para-teachers in the sample, not a single para-teacher was aware that he/she was doing voluntary work. Their voluntarism was limited to filling up forms, writing applications for villagers or giving them some advice when asked for, which they would have done otherwise also (if they were not para-teachers) as members of the community. All of them spoke of a salary and not honorarium, and many complained that it was far too little for the work they were doing and hoped that after some time their post would become permanent and they would be absorbed as regular teachers. It may be mentioned that there is already provision of absorption after putting in a service of 8 to 10 years in Shiksha Karmi Project (Rajasthan).

Conclusion

The para-teachers of SKP, Rajasthan do not possess the spirit of voluntarism as conceived in the programme

Honorarium

In the five programmes under the study the honorarium of para-teachers varyies from Rs 1000 per month (Education Guarantee Scheme, Madhya Pradesh) to Rs 1800 per month (Shiksha Karmi Project, Rajasthan).

Assumptions

The low honorarium of para-teachers as compared to that of regular teachers reduces the cost of UEE and the local, educated but unemployed youth finds a gainful employment.

Reality

Before joining, para-teachers, most of those in the sample, were unemployed, doing some odd jobs (some of them were even working as casual wage labourers) or working on their own farms. They were young and aspiring for some kind of work in which their educational skills/competencies could be used. The para-teacher programmes provided them with this opportunity. However, the expectation that they would continue to be satisfied with a meagre salary has been proved wrong. All the para-teachers under study felt that the honorarium they were receiving was far too little for the work they were doing and hoped that they would become permanent and be absorbed as regular teachers

The three old programmes — Shiksha Karmi Project, Rajasthan, Volunteer Teacher Scheme, Himachal Pradesh and Shiksha Karmi Yojna of Madhya Pradesh — have already witnessed litigation moved by the para-teachers of these programmes on various grounds of equality and social justice. These programmes are reported to have succeeded in overcoming the problems arising out of litigation.

Conclusion

The low honorarium, however, does not seem to be conducive to long-term sustainability of these programmes.

Recruitment Procedure

In three (Alternative Schooling Programme and Education

Guarantee Scheme . Shipsha Karmi Yojna, Madhya Pradesh; and Shiksha Karmi Project, Rajasthan) of the five programmes, the process of recruiting para-teachers starts from the village level where the community is involved in identifying the deserving candidates. Candidates are then screened and/or given a test to examine the level of their educational achievements. Other factors which are considered are his/her outlook towards caste, religion, gender, etc., and above all, that he is accepted by the community. The appointment is made by the *Zila Panchayat/Gram Panchayat* (Madhya Pradesh) as the case may be or any other body (e.g. Shiksha Karmi Board in Rajasthan) responsible for it.

For the selection of Shiksha Karmis in Madhya Pradesh, there is a Selection Committee consisting of the representatives of the Janpad Panchayat, Zila Panchayat, the Education Department and experts nominated by the Standing Committee on Education. The selection of Volunteer Teachers in Himachal Pradesh is done by the officials of the Education Department.

Assumptions

(i) The involvement of community in the selection procedure will ensure the community's increasing role in the smooth functioning of school later; (ii) since Government Primary Schools and the Education Department do not seem to be very concerned about community participation in the running of the school, the selection of para-teachers in these schools (VTS, H.P. and S.K.P., M.P.) is done by the committees constituted for this purpose and represented by officials of the Education Department and representatives of the Block and Zila Panchayats as the case may be.

Reality

After excluding the Volunteer Teachers (4) of Himachal Pradesh and Shiksha Karmis(6) of Madhya Pradesh, the remaining 22 para-teachers were selected according to the procedure laid down. In two or three cases, selection was reported to have been influenced by political heavy weights in Madhya Pradesh.

Conclusion

The community's involvement in all the decisions necessary for

setting up a school inculcates in its members a sense of belongingness to the school, which is a first step towards realising the concept of the community's ownership of the school.

Professional Preparation and Continuing Professional Support

In two programmes — Shiksha Karmi Yojna (Madhya Pradesh) and Volunteer Teacher Scheme (Himachal Pradesh) – there was no provision for professional preparation or continuing professional support until the DPEP appeared on the scene and started its programme of school improvement, among others, through training, workshops and academic support in the field.

In the other three programmes there is a provision for professional preparation (pre-service teacher training) of varying duration: 37/50 days (Shiksha Karmi, Rajasthan), 18 days (Education Guarantee Scheme, Madhya Pradesh) and 21 days (Alternative Schooling Programme, Madhya Pradesh). Continuing professional support (in-service training, workshops, etc.) is also available in all the three programmes. Shiksha Karmi Sahayogis are responsible for a unit of 15 schools. They solve the academic problems of para-teachers of these schools when they visit them (which has to be once in a month) and also in a 2-day monthly meeting at Block or Cluster level. Besides, workshops and meetings are held each year for the purpose Gurujis of EGS school receive academic support from the Cluster academic coordinators when they visit the schools. Para-teachers of Alternative Schools are provided academic support by *Parayavedshaks* or Supervisors, each responsible for 10 schools, in a one-day meeting held each month. Apart from this, AS and EGS para-teachers are also provided with academic inputs in workshops/training, the duration of which is 10-12 days.

Assumptions

Pre-service and in-service training and academic support are provided to make a teacher professionally competent and keep him/her abreast of the improved and innovative methods of teaching, use of teaching and innovative teaching-learning material and school organisation, and eliciting deeper community involvement. The assumption, therefore, is that the para-teacher

will make use of what he/she has learnt in these training programmes and workshops.

Reality

Almost all the para-teachers (32) included the study said that the training programmes have proved to be helpful in their work as they have learnt in training/workshops new ways of teaching children and how to make TLM and use them. Specifically, these two were named by all besides other things such as *bacche ko sahaj bhava se aur pyar se padhayen, baccho ko school se kaise joden.* The reality is that in all of the 20 para-teacher schools there was hardly any reflection of the fact that para-teachers had learnt anything in the training. Corporal punishment, the same old method of textbook-based teaching and rote learning and nil or little use of innovative TLM were the characteristic features of all these schools.

In monthly meetings (SKP, Rajasthan and ASP, Madhya Pradesh) most of the time is spent on non-academic matters; academic problems receive a back seat. Therefore, monthly meetings have not been effective in discussing the para-teachers' academic problems and solving them.

The focus of the training workshops held each year (SKP, Rajasthan and ASP, Madhya Pradesh) is more on preparing the teacher for understanding the textbook materials of a particular class/level.

Conclusion

If teachers' training has to be effective the foremost question that must be addressed is: What should be the minimum qualification of a para-teacher so that he/she is able to intellectually process the curriculum content of the training, make his/her own judgement about its validity and applicability and imbibe it to translate it into practice? Another question that immediately crops up is: What should be the duration of pre-service training for him/her to acquire basic skills and competencies and, lastly, what could be an effective in-service academic support system? Besides, the curriculum and quality of training and the nature of in-service support should be seriously reviewed and improved, where needed.

Community Participation in School Affairs

Since the para-teacher belongs to that very village (where the school is located) or a nearby village, he/she has an in-depth understanding of the local beliefs, traditions, customs, taboos and the cultural ethos of the community, which a teacher from outside, from a different socio-cultural milieu cannot have, Besides, as he/she has grown in that community, villagers know about his/her nature, weaknesses and strengths. Organically, he/she is an integral part of the social history of the community. This fact places the para-teacher in a strategic position to elicit the community's participation in school affairs and management.

Assumptions

The ownership of the school by the community will also improve the functioning of the school, leading to conditions necessary for effective learning.

Reality

The participation of the community in school affairs is not as broad as it should be in any of the 21 para-teacher schools under the study. Their participation is limited to solving the minor problems like repairing of building by providing free labour (shramdan) or attending the national functions of 26 January and 15 August at the school and making little contributions for sweets and prizes which are distributed to the children. The reasons for low involvement of the community amongst others, are that (i) paryavekshaks or supervisors do not interact with the community when they visit the school; (ii) officials at block and district level also do not interact with them on their visit to the school

Conclusion

The community's participation in school affairs is low and also do not broad-based. If para-teachers belonging to the same village are not able to mobilise the community, it is indicative of a poor rapport between the para-teacher and the community. The reasons for it need to be looked into and necessary steps taken

The School

Classroom Processes/Classroom Culture

Classroom processes and/or classroom culture include the teaching-learning environment in the class, the seating arrangement, interaction and discourse between the teacher and pupils, teaching method, use of TLM, peer/group learning and other aspects that might constitute a classroom culture. Learning-achievements in fact are the end-products of classroom processes and culture.

Assumptions

Classroom processes and culture provide a stimulating environment which promotes teaching and learning. Therefore the way the classroom culture is created is critical.

Reality

In most of the 21 para-teacher schools classroom culture did not provide a stimulating environment which could ensure interesting and effective teaching-learning. This is evident from the characteristic features of the classroom culture prevalent in these schools: (i) an appropriate sitting arrangement contributes tremendously to the quality of teaching-learning processes. It appeared that most para-teachers were not conscious of this fact with the exception of two teachers, Mia Ka Padla (Rajasthan) and Kunjra Khodra(Madhya Pradesh) (ii) corporal punishment was used in all the 21 para-teacher schools and by all para-teachers with an exception of one or two; (iii) the teaching-learning process was largely textbook based; other activity or material was seldom used; (iv) only very few teachers felt the necessity of drawing upon the information or knowledge that children bring into the class; the rest were not even conscious of it even when an opportunity presented itself; (v) most of the time it was teacher who spoke in the class; the children spoke only when they were asked some questions: children were not seen putting questions to the teacher-the entire transaction sounded like a monologue; (vi) emphasis on rote learning was clearly visible in most of the teaching-learning activities; (iv) generally, no independent learning activity was offered to children except copying from the

blackboard; (viii) some teachers were found giving more attention to bright students than to weaker students; (ix) there was no attempt on the part of the teachers to promote peer-learning in the class; (x) often teachers did not know what and how much the children understood of a lesson; (xi) no attempt was, generally, made to make classroom attractive by displays, charts and such other things, (xii) given the fact that in many P-T schools teacher-child ratio is high and there is no space for holding classes separately, it becomes necessary that in such situations multigrade teaching is employed: with the exception of a few para-teachers it was not effectively practised because para-teachers did not possess this technique; (xiii) to create an interesting and effective teaching-learning environment, it is essential that lessons and teaching strategies are planned in advance; in one programme (SKP, Rajasthan) the teaching plan is centrally prepared in a 2-day monthly workshop for the next month and for each class and subject; it was observed that there was a tendency to push through the teaching plan as scheduled without paying due attention to the fact of how much of the content was followed by how many students. with the exception of five para-teachers, other teachers of the five para-teacher programmes come to the class unprepared and without a lesson plan; (xiv) no record of child' s progress is kept for evaluating him/her continually on a daily or weekly basis; (xv) while there was a provision for a children's library in SKY, Madhya Pradesh, SKP, Rajasthan and VTS, Himachal Pradesh, it was not used by children in SKP, Rajasthan as they didn't have access to it, whereas in other places they did make use of the library.

Conclusion

The teaching-learning situation as observed in the para-teacher schools under the study was unsatisfactory. Para-teachers cannot create a classroom culture of effective learning unless and until they are educated and trained in the basics of classroom processes and are willing to use them.

In most government primary schools teaches knew very well various methods and the basics of good teaching but didn't use them. There teaching-learning processes also suffered from the drawbacks mentioned above. Although corporal punishment was

a regular feature of almost all the schools, it appeared that it was more frequently used in government schools than in para-teacher schools.

School Management

In the para-teacher programmes there has been a great emphasis on the formation of local level committees for creating an environment for schooling and school management at the village level. At Block and district level a school is managed by BEO, BDO and the Panchayat Samiti and at the district level by DEO, PO, DPEP and DEO

Assumptions

The formation of a VEC will ensure in raising people's/community participation in various school activities.

Reality

A Village Education Committee has been formed/constituted in all the schools under study. This was also confirmed by the records (register indicating the names of VEC members and the meetings) available in the school, as well as in discussions with the community's members and para-teachers.

However, in all the schools the VECs were constituted after the inception of the five programmes under study. In all the schools it was either the para-teacher or the Sarpanch who identified the members of the VEC. The number of members of the VEC varied from eleven to fourteen . In all the VECs there was adequate representation of different castes and women. The procedure followed for the constitution of the VEC was, however, not in conformity with democratic norms and therefore such VECs often had members not necessarily interested in education.

Although VEC members were expected to meet once a month, no single pattern was observed for the frequency of the VEC meetings. In some places it was mentioned that VEC meetings were organised when the need arose The study clearly indicates that the participation of women in VEC meetings is a mere formality. Not only they do not attend or participate in the meeting but do not have any role in decision-making. Some of them who

do attend meetings do not express their opinion.

The role of the VEC was limited to providing infrastructural facilities, addressing issues of enrolment and drop-out and retention of children and participation in national festivals. In some places, however, such participation was not forthcoming. VEC members were not involved in either assessing teacher's performance or the educational levels and performance of the children.

Most VEC members did not undergo any training Those members who participated in training often saw it as a mere formality and lacked clarity on their role and responsibilities as VEC members.

Conclusion

The study indicates that VEC committees, even though they have been formed in most villages, have yet to play an active role in school management and in the teaching-learning process. There is evidence to suggest that the programmes and the district level officials have not visualised the full potential of VECs role and responsibilities and what could be done to make full use of it.

Learning Achievement

To assess the learning achievement level of the students in various PT/government schools this study adopted various qualitative and quantitative techniques like classroom observation, interaction and discussions with teachers, students and parents, written and oral tests in Hindi and maths for the Class III and Class V children.

All the schools selected for this study took part in the test programme with the exception of the government school, Karauli, where the teacher was not available and a school in Madhya Pradesh where teachers and students were reluctant to here such tests. It was decided to take a random stratified cross section of students (inclusive of girl students) for the tests in Hindi and maths from Class III and Class V.

Test questions were designed keeping in view the skills and competencies that Class II and Class IV-pass children would

have acquired. In Hindi, skills and competencies like listening, speaking, reading, writing and comprehension were evaluated. For mathematics, competencies in number-sequencing, place-value, addition, subtraction, multiplication, division, and application of maths were tested.

Findings

1. The performance of both boys and girls in all the four para-teacher projects, SKP Rajasthan, Alternative Schooling, Madhya Pradesh and VTS, HP and Shiksha Karmi Yojna, MP (where para-teachers are working along with regular teachers) is a matter of concern. Their performance is poor or very poor.

2. In almost all the para-teacher schools the overall performance of Class V showed a downward trend in comparison to the Class III performance. The girls' student's overall performance declined more sharply than the boys'.

3. If we compare the performance of students of a government school with that of a para teacher school, the government school students' have performed slightly better.

6

Opportunity Time for School Learning in DPEP Districts

C.S. Nagaraju

The study attempted the conceptualisation of the teacher time in the form of a structural variable designated as 'Opportunity Time' and operationalise the same in empirical contexts. It further explored opportunity time in terms of mediations of teachers like imparting direct instruction, facilitating group work and providing feedback to individual work. Qualitative research techniques like non-participatory observation, interviews with teachers, parents, children and the community were also used for the purpose of data collection. The data on opportunity time was collected from 48 schools of 5 DPEP States — Andhra Pradesh, Karnataka, Maharashtra, Madhya Pradesh and Uttar Pradesh. Five to ten different types of schools were identified to make comparisons within the States. The main findings of the study indicated that opportunity time provided by the schools in the form of teacher-days varied across the States. The accounts of loss of teachers' timing were due to multifarious reasons like engagement in development activities, extended in-service programmes, transfer, deputation and extended work for Board examinations.

Introduction

School effectiveness more often is considered as flowing out of teacher competence and resources. Many interventions taking

place focus on supply of materials and in-service teacher training. The results of such interventions do indicate their positive influence on school effectiveness, but the magnitudes of increase in the measurable indicators of school effectiveness tends to be small when the school is used as the unit of analysis. This may be due to the neglect of the underlying factors which influence the utilisation of the teacher-based or school-based interventions. One such factor is time. Time as an educational factor manifests itself in many ways in practice, like allocation of time to various learning areas, time-scheduling of the day's activities, timing of school working days, etc. In this way, time becomes a structural component in a given system of education. Time also fares in the studies on learning by individuals. Mastery-learning developed on the basis of the Carroll model gives the central place to time at the root of all organised learning. Mastery-learning defines rate of learning as aptitude. If a person has high aptitude for music, it means the person can learn music faster. In other words, theoretically it is possible to teach to a reasonable level of any competency/skill to any person provided the individual is allowed the required time according to her/his rate of learning.

In the Indian context, educational researches on scholastic achievement have not built time as a determining factor in explaining inter-school variations in school outcomes. An attempt was made to conceptualise time as a structural element in the primary school curriculum system of Karnataka and examine how it may affect school outcomes in rural small schools having two teachers (Nagaraju, 1995). Another study did estimate the opportunity time based on observation of schools located in communities with differing characteristics (Anitha, 1993). But, systematic studies to evolve a measure of time in the form of a structural variable and use it empirically to measure its variation across different school contexts and concomitant school outcomes have not yet been attempted in India. This paper attempts to discuss the conceptualisation of time in the form of a structural variable designated as 'opportunity time' and operationalise the same in empirical contexts.

Opportunity Time

In India the number of years of primary schooling is either 4 or 5, and the classes/standards comprising the primary stage are either 4 or 5. Thus, the primary gradation is in the form of year grades. Teachers are expected to teach all the prescribed content to reach the defined educational objectives in a given year to the given class/standard. The base of the primary curriculum in Indian contexts is in the form of a syllabus. A syllabus consists of objects, content and time distribution across different curricular areas for each class/standard. For example, in the State of Karnataka, the primary curriculum consists of four academic years of schooling. Each academic year is of the duration of 30 weeks and each week consists of six working days. A school is expected to work for six hours divided into eight periods of forty minutes in two sessions on all week days excepting Saturdays. On Saturdays, the school has to work for four hours divided into five periods of forty minutes each. Thus, a school week consists of 45 teaching periods distributed across curricular areas. Since the curriculum is linear, scope for making up the deficiencies in learning of the previous year is not provided in the next year. Provision of adequate time for learning within a year in the curricular structure described above becomes crucial for expected levels/standards of learning in different areas.

Any objective-based learning at primary level requires the mediation of the teacher in many ways like imparting direct instruction, facilitating group work and providing feedback to individual work. The time given by the teacher to all such activities constitutes 'opportunity time'. This basic parameter of school effectiveness decides the upper limits of quantifiable school outcomes. Actual outcomes within this limit depends upon how effectively the opportunity time was utilised. Hence, opportunity time becomes a structural factor.

Measurement of Opportunity Time

Opportunity time is not a mere counting the number of days the school functioned. It is the amount of time counted in the form of the teacher engaged a learning group In any given school, there will be a minimum of four or five grades forming distinct

learning groups. Sometimes one or more of these grades may have been divided into two sections. Since each of such learning groups are attached to one or more teacher in most of the cases in primary schools, the opportunity time has to be calculated with reference to each teacher. Such measurement can be aggregated at school level to ascertain the opportunity time in terms of teacher-days In schools having a lesser number of teachers as compared to the number of year-grades taught, the opportunity time depends upon the mode of engagement of children belonging to different grades at any given point of time. As an illustrative model, the following example is given to calculate the opportunity time in teacher-days in a school having four learning groups in the form of standards (year grades):

No of days the school functioned during the year :	210 days
No of teachers working in the school:	4
Maximum limit of the teacher-days the school could provide.	840 days
Absence of teacher No 1 in charge of Standard I	
Various kinds of leave availed :	30 days
Did not come to school because of other duties :	10 days
In-service training	5 days
Total no. of days the teacher was absent :	45 days
Absence of teacher No. 2 in charge of Standard II	
Various kinds of leave availed .	28 days
Did not come to school because of other duties :	10 days
In-service training :	5 days
Total no. of days the teacher was absent :	
	43 days
Absence of teacher No. 3 in charge of Standard III	40 days
Various kinds of leave availed :	

Did not come to school because of other duties .	10 days
In-service training	0
Total no of days the teacher was absent.	50 days

Absence of teacher No. 4 in charge of Standard IV

Various kinds of leave availed .	29 days
Did not come to school because of other duties :	16 days
Monthly meetings	5 days
In-service training	5 days
Total no of days the teacher was absent·	55
Total number of teacher-days lost	123
Total number teacher-days made available	840–123 = 717days
Average teacher-days per learning group	179 days

Similarly, another school with two teachers and having 4 Standards

Reported number of days of school functioned :	205 days
Maximum limit of the teacher days the school could provide	410

Absence of teacher No. 1 in charge of Standards I and II

Various kinds of leave availed :	19 days
Did not come to school because of other duties :	16 days
Monthly meetings :	5 days
In-service training .	10 days

Total no. of days the teacher was not in school : 50

Absence of teacher No. 2 in charge of Standards II and IV

Various kinds of leave availed:	18 days
Did not come to school because of other duties ·	16 days
Monthly meetings	
Inservice training :	10 days

Total no. of days the teacher was not in school	44 days
Total number of teacher-days lost	94
Total number teacher-days available	410–94 = 316
Average teacher-days per learning group	79

From the above examples, it is clear that the number of teacher-days available to children varies from school to school. But the above calculation represents only the physical presence of the teacher in the school. Further loss of opportunity time occurs in the following ways:

The teacher is engaged in filling attendance reports for midday meal distribution

The teacher is filling various formats for supplying information sought by the authorities.

The teacher in a small school being in charge of two or more learning groups, teaches one at a time. In all such situations, the children of one group spend their time without doing any organised thing or engage in some repetitive drudgery which goes unsupervised and not followed up by the teacher at a later point of time. The time lost in the above form can come from observations of classrooms processes and school practices.

Data on Opportunity time

Source of Data

A study to establish a bench-mark on classroom practices and process is currently being carried out in DPEP districts in seven States. The research design is in the form of case studies and a specified number ranging from 5 to 10 different types of schools have been identified in each State to make comparisons within the States The study has adapted the qualitative techniques Data on classroom practices, training and achievement of children graduating from the school are included in the study Information on classroom practices is collected through non-participant observation, interviews with teachers, children, parents and community members. The information on training is collected

through observations of training, interviews with teachers, field-level trainers and supervisors and content analysis of documents. Achievement tests based on official Minimum Levels of Learning (MLL) for Standard IV/V have been administered in all the schools. The data needed for the paper is drawn from the above ongoing study from five States.

Nature of Data

The data on the number of teachers, classes/standards/teaching-learning groups and the number of days each of the teachers was present in the school was obtained from school records. One trained observer in each State went to each school and observed the functioning of the school for an entire day. The observer noted what was happening in different classes while she/he was observing a particular class. During the classroom observations, detailed notes were taken on different aspects of the classroom practices and incidents, and the verbal interactions in the classroom recorded. These filed notes provided data on opportunity time for each grouping of the children. In most of the cases such observations were made for two days at a time in three phases amounting to six days of observation. These six days represented by and large all the week days. In the cases of study schools of Kurnool district in Andhra Pradesh, the observation was made for five days in each school. The amount of time lost to specific learning groups even when the teacher was present in the school is estimated on the basis of the observation of what teacher did in the school when he/she was present

Method of Data Presentation

The data on opportunity time will be presented totally for 48 schools identified for the case studies drawn from Andhra Pradesh, Karnataka, Maharashtra, Madhya Pradesh and Uttar Pradesh. These cases represented different types of schools in each State. Comparisons will be made across types of schools pooled from all the States First, the opportunity time provided by the school the form of teacher-days due to the presence of teachers across different States based on records of schools observed is given in Table 1.

TABLE 1

Opportunity Time Based on School Records Across Case Studies

State	*District*	*Block*	*No of Cases*	*Mean Teacher Days*	*STD*
Andhra Pradesh	Kurnool	Kurnool	10	165	16
Karnataka	Mysore	Hunsur	10	180	21
Maharashtra	Nanded	Kinwat	10	188	26
Madhya Pradesh	Tikamgarh	Tikamgarh	9	185	29
Uttar Pradesh	Lalitpur	Mahroni	9	179	23
All Cases			48	179	24

From the data presented above, excepting Andhra Pradesh, mean the teacher days range between 180 to 190. But in the case of Andhra Pradesh it is a mere 165 days. Variation within the cases of A.P. is less as compared to other States. On examination of the reasons for absence of teachers, it was found that the teachers from primary schools are engaged in many developmental activities like Janmabhoomi, Kutumbajythi house enumeration, etc., in addition to extended in-service training programmes In Karnataka, the teachers teaching the first and second standards have attended two training programmes accounting for 18 days each. It is not surprising to note that the case study schools in Maharashtra show a larger number teacher days. In-service training of teachers are scheduled during the summer vacations in that State. In the case of Uttar Pradesh, teachers transfers, deputation and extended work during the month of March for the Board examinations account for the loss of teaching days.

As pointed out earlier, the information in Table 1 represents the presence of teachers in school. But opportunity time essentially is the amount of time the teacher present in the school engages a group in teaching-learning activities. Any structured activity to achieve a set of learning objectives followed by some kind of assessment of the outcomes would constitute learning activities. Extensive observations of the schools under consideration have indicated that not all groups/classes are engaged by teachers in learning activities all the time during the day. Based on such observations of teachers of classes included for observation of the functioning of the school; classroom practices and processes,

estimates of actual engagement time of each teacher have been made and aggregated at the school level. Table 2 provides the actual teacher days after correcting for the time spent by the teacher in actually engaging a class/section/group in teaching-learning activities.

TABLE 2

Opportunity Time Based on Classroom Observations Across Cases Studied

State	*District*	*Block*	*No. of Cases*	*Mean Teacher Days*	*STD*
Andhra Pradesh	Kurnool	Kurnool	10	106	43
Karnataka	Mysore	Hunsur	10	111	37
Maharashtra	Nanded	Kinwat	10	117	38
Madhya Pradesh	Tikamgarh	Tikamgarh	9	126	62
Uttar Pradesh	Lalitpur	Mahroni	9	129	46
All Cases			48	118	45

From the information given in Table 2, the actual time provided by teachers for teaching- learning activities is far less than the recommended days of instruction reflected in the syllabus. The variation across cases is also high. Much of the time lost is accounted by the schools where teachers have múltiple classes/groups/sections in one room and teach a specific class/section/group while the others wait for their tern. This explains the lower number of teacher days in States like Andhra Pradesh, Karnataka and Maharashtra where two or three teachers teach four or seven standards/classes. Another reason for reduction in teaching leaning time is that the HM or another teacher spends more time in doing various clerical duties going under the name 'Office work'. Non-engagement of teachers also differs across different types of schools. Table 3 provides such comparisons.

TABLE 3

Opportunity Time Based on School Records Across Different Types of Schools

Classification of Cases		*No of*	*Official Cases Days*	*Classroom Observation Teacher Based Teacher Days*
Management type	Government	38	175	105
	Private	10	194	164
Location type	Urban	16	184	140
	Rural	32	177	106
Teacher class ratio	One class one teacher	25	184	139
	Multiple class one teacher	23	174	94

It may be noted that both the crude rate of teacher days and the refined rate of teacher days are high in private schools. It was observed that the teachers in these schools are not required to do any duties which take them away from school. They take only casual leave. In general they do not participate in in-service training programmes. The teachers in unaided private schools are paid far less than the teachers working in the government schools. The only reason for their work participation is that they are accountable and the H.M. in such schools have powers to take disciplinary action on truant teachers. Some of the schools under private management had less teachers as compared to the classes taught and there was no adaptation of learning groups for multilevel teaching. Hence, functional teacher days get reduced.

The functional teacher days are low in rural schools as compared to urban schools. Two/three-teacher schools are found more in rural areas than in urban areas. Most of the teachers of rural schools commute and the number of unaccounted absences is more in rural schools. This accounts for the large difference in functional teacher days in rural schools as compared to urban schools.

Finally, the functional teacher days is lowest in schools where a teacher is in charge of multiple classes at any given point of time. But the curricular structure imposed on such situations makes teacher engage only one class at a time.

Discussion of the Findings

Surprisingly, research studies on school outcomes in the past have not come out with proper explanatory model to explain the differences among school categories in India. Most of the research designs use individual student as unit of analysis and hence structural elements of the curriculum are not represented. Many studies do not go beyond observing that the children studying in different types of schools achieve differently. But no explanations are given to explain the causal factors behind such findings. Many studies in the past have shown that the achievement of children slides down at the end of third year of school in the Indian context. Most of them the speculated reasons are attributed to individual psychological factors or curricular load in relation to cognitive developmental stages of children. On the other hand no one has speculated about the structure of curriculum.

One need not labour hard to demonstrate that opportunity provided for learning decides the amount of learning. Opportunity time in functional terms is mainly decided by its structuration. The schools with two or three teachers are seen as a problem of resources instead as a curricular problem. As in the case of Karnataka school syllabus, all the states have highly structured uniform curricular structure requiring one room and one teacher per class/section Secondly, the centralised curriculum is pivoted on classwise textbooks. The curriculum assumes opportunity time which in reality is not available. In most of the schools, the accountability is bureaucratic and to outside remotely situated source. Hence teachers also interpret their situation as anomalous and excusable for not being able to meet the expectations. Even the well intended interventions for quality improvement take the teacher away from school. In addition, teachers in government sector are employed for various non-school related activities.

This does not mean that opportunity time accounts for total variance. The process factors and the inputs that go into the process are equally important. But opportunity time sets the outer limits of achievement potential in a given curricular structure. Opportunity time can be increased by building flexibility into the structure of the curriculum practised in the school.

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SECTION II

Inventive Proposition for School Effectiveness

The studies discussed in this section include.

- School Effectiveness at the Primary Stage: A View of the Kampala School Improvement Project
- Project for Improvement of Education in Small Deprived Primary Schools in Sri Lanka– An Evaluation
- Effects of Learning Corner Activities on Learners' Achievement

7

School Effectiveness at Primary Stage: A View of the Kampala School Improvement Project

Scholastica Tiguryera

The study reviews the contribution of the Kampala School Improvement Project to school effectiveness at the primary stage. The major aim of the project was to give direction to the educational reforms in Uganda and improve effectiveness at the primary stage. The study revealed that sustainability of improved effectiveness could be achieved by empowerment of teachers and by collaborative efforts.

The Concept of School Effectiveness

School effectiveness is conceptualised differently by different individuals depending on various factors. A review of some of these definitions will throw light on some of these factors.

Mortimore (1991a) has defined an effective school as one in which students progress further than might be expected from a consideration of its intake. According to this definition, an effective school adds extra value to its students' outcomes in comparison with other schools serving similar intakes. By contrast, in an ineffective school students make less progress than expected, given their characteristics at intake. A reflection on this definition may raise a question such as, "What about a school whose students' progress according to what is expected of them without necessarily adding extra value?"

Fullan (1995) conceives school effectiveness as "producing the best possible learning outcomes given variable student

characteristics and needs, changing resources, and a dynamic definition of what should be taught". The author of this paper agrees with Fullan and Mortimore in that there cannot be standardised effectiveness and outcomes for all the schools because each school is unique with unique students who have unique characteristics.

It can therefore be inferred that definitions of school effectiveness are dependent upon a variety of factors some of which have been identified by Sammons(1994) as: sample of school examined; choice of outcomes measures; adequate control for differences between schools in intakes to ensure that "like is compared with like", methodology and time-scale

Basing themselves on studies, models and experiences, some leading thinkers and educationists have come up with factors that make a school effective. Examples from two developed countries (Britain and America) are specified below.

What Factors Make Some British Schools Effective?

Reynolds. D. et al. (1996) present nine key factors associated with school effectiveness as identified below:

- Professional leadership
- Shared vision and goals
- An orderly and attractive learning environment
- High quality teaching and learning
- High expectations
- Positive reinforcement
- Monitoring pupil progress and evaluating school performance
- Pupil rights and responsibilities
- Purposeful teaching.

American National PTA Components of an Effective School

The American PTA concept of school effectiveness encompasses the following factors:

- Clear goals and objectives
- Adequate and equitable funding and financial management
- Academic programmes that provide the opportunity for all students to develop academic and like skills
- Assessment programmes that identify how instruction can be improved and learning can be increased
- Parent, family and community involvement in every facet of the education and development of children from birth to adulthood
- Skilful teachers and staff
- Students who are life-long learners and good citizens
- Support services that address the holistic needs of the students.

Context Of Primary Education In Uganda

In the 1960s the educational system of Uganda was considered to be one of the best in East and Central Africa. From the second half of the 1960s to the mid-1980s, the once admired system drastically declined, due to civil wars, civil unrest and general instability which disrupted all aspects of Uganda's infrastructure, including education. Intellectual suffocation was perhaps one of the most devastating aspects of these difficult times. Books, professional journals, other educational reading materials and office/laboratory equipment became grossly inadequate. Education was devalued and suffered greatly (USAID, *Education Decentralisation in Africa*, 1996). The rise in numbers of pupils/students also contributed significantly to the decline of Uganda's education system.

Primary schools did not escape the traumatic experiences. As part of the nationwide reforms embedded in the current

government's (NRM) Ten Point Programme, the Ministry of Education and Sports (MOES) commissioned the Education Police Review Commission (EPRC, 1989) and the resultant Government White Paper (1992). These documents now provide the backbone of many reforms, including those relating to the Primary Education Sector.

Primary Education

The general reform measures at the primary school level mainly addressed by Teacher Development and Management Systems (TDMS - a national programme funded by USAID which mainly focusses on Primary School Education reforms) are multidimensional and some of their objectives focus on teachers' and headteachers' training prgorammes; teachers' terms and conditions of service; community participation; instructional materials; examination process; national assessment; and rehabilitating schools and teachers' colleges.

These reforms aim at improving pupils' mastery of literacy, numeracy and other basic life skills, improving school administration, management and accountability and reducing inequities in children's participation in primary schooling(Carassco, Munene Kasente and Odada, 1996, The EPRC, 1989 and the Government White Paper1992). Carasco et al, (1996) conducted a study focussing on school effectiveness factors such as school culture, classroom teaching and learning process, pupil outcomes, children's conditions, parent/ community participation and support from system.

According to the findings of their study the state of primary education in Uganda still is in need of considerable improvement.

The reasons for this are manyfold and include: lack of libraries in most schools (more than 80%); lack of latrine posts for girls; a shortage of textbooks, where one might be shared between 40 to 55 pupils, depending on the subject and class/standard, and lack of physically suitable classrooms. This study further revealed that the majority of the head teachers behaved in autocratic ways and held little regard for the feelings or well-being of staff or pupils and that about 71% of the schools never followed timetables Many teachers are perceived to be demoralised

because of the aforementioned conditions, the salary delays and inadequate remuneration for their services. Teaching, according to this study, was dominated by questions and answers, lecture and class recitation methods.

The methods used reflect on teacher preparation, in-service training, resource availability and use, plus the role of national/ public examinations (Carasco, et al., 1996 and the GOU/UNCC, 1994).

Their study gave rise to another study on Teachers' Work Experience and Pupils' Schooling Experience as determinants of achievement in primary schools by Munene et al.

This study investigated the antecedents and consequences of the teachers' work environment as correlates of achievement in Ugandan primary schools. The work environment is understood as the perception and the reality of the conditions in which teachers work.

The antecedents of concern include educational policies, parental and community support, children's conditions and school culture.

The study concentrated on the context in which the primary teachers were operating, their perceived and actual experience of this context and how those impinge on learning outcomes. According to the findings related to instructional materials, the situation varied from school to school. Generally, there were shortages in lower primary (P1 to P4).

The pupils reported that their parents did not cater to their basic needs, that they abused them, and that they overloaded them with domestic responsibilities. In many cases, pupils cited shortage of food and lack of basic requirements such as bedding and clothing.

At school, pupils went through various experiences, some of which affected their performances adversely. Adverse experiences included, amongst others, frequent beating, shortage of textbooks, lack of furniture, poor state of classrooms, and manual labour. The pupils also considered many of their teachers unfair, too demanding, unkind and uninterested in teaching.

It was further discovered that some of the children's schooling experiences correlated either positively or negatively with pupils' achievement in numeracy and literacy tests administered by the researchers and with the overall performance in Primary Leaving Examinations (PLE) For instance, teacher irritability and pupil victimisation correlated negatively while teacher-supportiveness correlated positively.

The study also revealed several descriptive characteristics of the teachers' work environment which included work strain, professional dissatisfaction, work overload (feeling of having too much work to do) and welfare. The highest-ranked problem was poor administration composed of an indifferent, dictatorial, sectarian and incompetent leadership.

The researchers identified three coping strategies the teachers used to deal with the environment. The strategies were apathy, helplessness, and recycling of notes. Apathy included neglecting work, deliberately not exerting oneself fully in teaching and moving with only the bright pupils. Helplessness described the teachers' inability to develop effective strategies to deal with the environment. Recycling notes related to teachers' unwillingness or inability to update their teaching notes.

One overarching conclusion is the finding that teachers in primary schools may be experiencing the psychological state known as 'burnout'. Burnout is the painful realisation that one is no longer able to help people one is responsible for and who need one's help and that one has nothing more to give (Pines et al., 1981). Burnout represents a depersonalisation of clients, a loss of caring, an attitude of cynicism towards them. It also represents a sense of apathy and loss of interest. The teachers and pupils reported among the teachers sufficient behaviours, characteristics of burnout, and the researchers observed some of those behaviours. Such behaviours reported by the teachers themselves, included the teachers paying attention only to those bright enough to follow and deliberately not exerting themselves fully in teaching.

A second major conclusion is the finding that the schooling experience of pupils is important in determining their performance at school.

Finally, the researchers reiterate the centrality of the teacher in educational reform. That centrality was first pointed out in Carasco et al. (1996).The researchers, therefore, recommended that emphasis in the balance of reform should swing towards the teacher.

Universal Primary Education vs. Primary School Effectiveness in Uganda

With effect from 1997, the government of Uganda basing on the White Paper(1992) embarked on UPE. The commencement of UPE in Uganda bred a multiplicity of related challenges which are a threat to the quality of education at large and school effectiveness in particular.

These challenges include lack of instructional materials, unfavourable teacher-pupil ratio, large class sizes, teachers' salaries/remuneration, headteachers' leadership and managerial skills and minimal community partnership in education endeavors,

The Kampala School Improvement Project (K/SIP) Contribution Towards School Effectiveness At Primary School Stage

The Kampale School Improvement Project funded by the Aga Khan Foundation and the European Community commenced in November 1994 (under the leadership of Mrs Gulzar Kanji) with the aim of improving the quality of teaching and learning in primary schools. So far the project has impacted 17 schools. Its purpose has been to enable headteachers and teachers to: promote active participation of children in their work; make learning interesting and exciting through the use of appropriate materials; develop a strong interest in books and reading; promote discussion, investigation, problem-solving and communication; achieve high standards while making learning enjoyable.

K/SIP tries to achieve its objectives through on-the-job training for teachers; workshops for headteachers, teachers and parents; production of low-cost educational materials; seminars, lectures, conferences and establishment and use of Teachers' Resource Centres (TRCs).

With regard to the already stated determinant factors of school effectiveness in the UK and USA, K/SIP contends that despite differences between the developed and the developing countries the same factors are just as important in Uganda as they are in U.K. and U.S.A.

K/SIP therefore addresses most of these factors stipulated by Reynolds but with varying degrees of emphasis. The major focus is on high quality and purposeful teaching and learning which is mainly handled during on-the-job training Through the intervention of developing and using low-cost materials, K/SIP tries to enhance an orderly and attractive learning environment During Senior Management workshops professional leadership and "shared visions and goals" are discussed. Continuous assessment has been introduced in all SIP schools to enable the teachers monitor pupils' progress. The rest of the factors except evaluating schools' performance have been addressed theoretically through workshops and practically during demonstration lessons. One factor that was not listed by Reynolds but which is included in the American PTA list of School Effectiveness is parents', family and community involvement in every facet of education and development of children from birth to adulthood This is a key factor of K/SIP's overall strategy especially during this second phase where the community is supposed to work in partnership with the programme team as well as other stakeholders to improve the quality of education. Service provision must respond to the ideas and initiatives of local users - and when local users are involved, ideas and initiatives will also flow (Alcock and Christenseen 1995).

Turning to the Uganda researches quoted in this paper, some of the factors highlighted are closely related to those obtaining in UK and USA, and some such as 'burnout' and unsupportive homes are peculiar to Uganda.

The K/SIP team through on-the-job training appreciate the teachers' problems of large class sizes and other demotivating factors such as insufficient pay but through demonstration lessons have shown them that something can be done despite the problems. Furthermore, as it has already been stated, through the community-partnership strategy parents are encouraged to give more support to their children.

The SIP phase I (1995-98) team comprised a director and four project assistants all of whom have experience in primary school and teacher education. The second phase team consists of a director, five programme officers, a community development officer (CDO) and a researcher. Each programme officer is in charge of a division but specifically works with four schools per year in collaboration with a centre co-ordinating tutor seconded by TDMS. The CDO mobilises the parents and other members to support their children's education and the researcher in collaboration with the rest of the team concentrates on the problems pertaining to the programme operations.

The major intervention strategies are:

- Weekly workshops for programme schools
- On-the-job training in the programme schools
- Production and use of low-cost teaching aids
- Establishment and use of 'mother' and mini teachers' resource centres (TRCs)
- Community mobilisation
- Programme-based on-going research

In the classroom, the strategies are'

- Development and use of low-cost materials
- Use of collaborative group work
- Establishment of classroom libraries and other learning centres
- Demonstration lessons, team-teaching, peer-tutoring, mentoring and coaching.

More details are given in the next sub-sections.

Professional Leadership and Shared Vision/Goals

The project has not designed an intensive programme for the headteachers but during the management and leadership workshops that have been conducted, the headteachers have formulated mission statements and started some work on school development plans. The project staff have encouraged

headteachers to formulate visions for their schools in collaboration with their staff and other relevant stakeholders, and, most importantly, headteachers have been helped to realise that they are curriculum leaders.

A Conducive Learning and Teaching Environment

Lack of teaching and learning resources was one of the major problems of the schools. Our immediate intervention was to introduce the production and use of locally available resources such as seeds, sticks, bottle-tops and any junk one could lay hands on Every member of the school community, including the headteachers, has been sensitised to collect junk. Some schools that are financially able have developed a culture of buying teaching and learning resources more than before. There are a lot of interactive displays including pupils' work and different learning corners in the classrooms. There is also an improved teacher-pupil relationship. Pupils as well as teachers feel they are more valued than before. This has created a more conducive and attractive learning/teaching environment

High Quality and Purposeful Teaching and Learning

Through on-the-job training and simulations during workshops, the project staff has introduced active resource-based teaching and learning in which pupils are actively involved in their lessons and provided with opportunity for talk and presentations. Through collaborative group work, discussions, shared learning, games and guided research, teachers and pupils have become more confident and developed a positive self-image, consequently performing more effectively.

High Expectations

Knowing that determination is the mother of success and that a sense of direction is a guiding light in life, teachers have learnt to encourage pupils to aim high in their school endeavours. Building the confidence of the pupils has been the foundation of enhancing the pupils' high expectations. Teachers have also been encouraged to have high expectations of themselves so as to act as role models for the pupils

Positive Reinforcement

The K/SIP team has encouraged teachers to use positive reinforcement such as praise, appreciation of pupils' contributions, involving pupils in identifying their errors and correcting them; encouraging pupils to try again after failing some tasks; and use of such strategies as progress charts, stars and healthy group competititons. Through group dynamics pupils have more responsibilities, such as being group leaders, scribes, peace makers, etc. All these make the pupils feel valued and they are motivated to work even harder The use of creative writing and self-editing has enhanced the children's ability to provide positive criticism. Both pupils and teachers are now open-minded and very reflective in their thinking.

Monitoring Pupils' Progress and Continuous Assessment

Continuous assessment has been introduced into all the project schools to enable the teachers assess the pupils and monitor their progress holistically as opposed to the common phenonmenon of assessing only aspects of the cognitive domain through tests and examinations. New tools like observation diaries, work samples, error analysis, pupil-self-evaluation schedules and parents' questionnaires have been introduced. This has helped teachers and parents to learn more about their children's learning strengths and weaknesses.

Staff Development Culture and Teacher Empowerment

In all of the schools the project has been working with, the culture of continuous staff development has taken root. Term-wise prorammes are drawn and sent to K/SIP labelled 'Follow-up Programmes'. Different schools identify their unique needs and workshop facilititators most of whom are the teachers themselves. In some cases the schools identify external facilitators who at times include the SIP staff. Induction of the new teachers and students from Primary Teachers Colleges into the SIP philosophy is carried out by the headteachers, SIP Coordinators and the regular teachers. This has motivated the teachers and enhanced their confidence.

Teamwork and Collegiality

Using the project staff as models, a culture of cooperative planning at departmental class and stream levels has been established. This endeavor has played a key role in integration and progression of ideas especially where some themes are spiral. There is more team work than the isolationist atmosphere that existed before SIP's intervention. The pooling of ideas adds more value to one persons' ideas.

Reading Culture

'Considering the fact that reading is the key to education and realising that the reading culture was almost non-existent in most primary schools the project staff had to devise a strategy of establishing it. This has been done through the establishment and use of class libraries, mobile library loan scheme and school-based teachers' resource centres (TRCs). There are eight school-based teachers' resource centres and one mother TRC at the Aga Khan Complex. Four of the school- based TRCs are school initiated.

The TRCs also house other resources such as activity cards, games and junk and are used as venues for workshops including those on production of locally available learning aids.

Other Aspects of Kampala SIP

Strategies for Better Implementation of UPE

The K/SIP team in response to the prevailing educational challenges in Uganda wrote a paper on Strategies for Better Implementation of UPE. This paper was presented to the then Deputy Commissioner for Education (Inspectorate) on request. A number of strategies ranging from innovative strategies in the classroom such as use of group work and activity cards to parental/ community involvement are imbedded in this paper. Some of the strategies such as collaborative group work and use of locally available resources have been stressed nationally.

Strategies for Sustainability

For purposes of sustaining the new ideas that have been introduced to schools some measures have been put in place.

These measures involve, among others, the empowerment programme where teachers have been encouraged to conduct workshops; formulation of TRC committees at school level; institution of a SIP schools coordinating committee; writing of the TRC manual and K/SIP handbook, networking with all stakeholders; establishing a culture of collecting/making and using locally available resources and introducing unifying strategies such as classroom reviews. The partnership with the City Education (in availing a tutor for each zonal TRC) and with the community (in providing resources continuously) is an assurance of sustainability of the TRCs and availability of resources.

The staff have also embarked on project-focussed researches which are also expected to contribute towards modification of their approaches as well sustainability of the successful interventions. Some of the research findings and other project ideas will be made known to the wider public through the Education Vision — a practice that has already taken root in K/SIP operations.

Community partnership in Enhancing Universal Primary Education in Kampala is the most satisfying endeavour in K/SIP activities because most beneficiaries and other stakeholders have been encouraged to take up ownership of the project operations. There is mutual partnership between one national reform programme and K/SIP.

This programme—Teacher Development and Management System (TDMS)—aims, among other things, at certifying all the untrained teachers who are serving and updating headteachers with modern leadership and managerial skills and enriching the teaching/learning process through refresher courses for teachers. The most prominent aspect of this partnership is the collaborative establishment and sustainability of divisional Teachers' Resource Centres.

Some Indicators of Success

- Active learning in the classrooms
- Use of collaborative group work
- Appropriate use of other methods such as class-teaching(fitness for purpose)

- Effective use of active resources including low and no-cost learning materials
- Availability of hands-on activities/games in classes
- Display of pupils' work
- Presence and use of classroom libraries and other learning centres
- Increased number of books borrowed from the TRCs and school libraries
- Team-work amongst teachers
- Improved children's social behaviour (in terms of sharing and airing views confidently)
- Formulating mission statements, making and implementing school development plans
- Use of continuous assessment tools such as diaries, parents' questionnaires and pupils' work samples.
- Regular attendance of workshops
- Drawing and implementing term-wise professional development follow-up programmes
- Keeping and using an induction file
- Headteachers and the community supplementing TRC/library resources
- Formulation of TRC committees
- Operational TRCs with support from parents and communities at large
- Active parent teacher associations
- Regular monitoring of teachers by headteachers

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8

Project for Improvement of Education in Small Deprived Primary Schools in Sri Lanka — An Evaluation

N. G. Kularatna

This is an evaluative study of a five-year project planned and implemented in 50 small primary schools in Sri Lanka. The package of interventions introduced with a view to improve quality of the teaching-learning process included experimental agriculture plot andthe health and nutrition education programme. The results indicated a positive effect on knowledge and status of health and nutrition in children and improvement in knowledge and skills related to agriculture. The findings of the study indicated that the approaches adopted in the project greately improved the standards of education in small deprived primary schools.

Introduction

A project supported by UNICEF was planned and implemented by the primary education department of the National Institute of Education, over a period of 5 years (1992-1996), to improve the status of education in small, deprived rural primary schools in Sri Lanka through a package of innovative approaches. These schools, making up nearly 22% of the total national network of schools, are situated mostly in remote rural communities whose social infrastructure facilities and economic conditions are very poor. Each school on an average has a pupil population of less

than 100 and 2 or 3 teachers to manage them. As the project was to be planned to improve the status of primary education, with an emphasis on nutrition education, a group of school/ communities from areas with notably low nutrition levels were selected for a baseline survey. Based on the findings of this survey, specific project objectives and activities were formulated and the same schools and their communities were chosen for project implementation. Apart from the original objectives and activities, several others have evolved and become parts of the project, over the 5-year project period in response to emerging needs and problems.

The specific objectives of the project thus evolved may be summed up as follows:

- Raising knowledge of and awareness in nutrition, health and agricultural practices
- Providing activity-based-child centered learning
- Promoting self-learning among children
- Enhancing teacher motivation and competence
- Increasing teacher competence in detection and analysis of learning difficulties and working out solutions to the.
- Familiarising teachers and principals with multigrade teaching methodology
- Improving of school management practices
- Activating parents and pupils to carry on with home gardening
- Raising parent's awareness about their duties and responsibilities in relation to education of their children
- Improving school-community relations

The following major activities were introduced in order to attain these objectives:

1. Preparation of midday meal to be done as a learning activity using a suitable recipe out of a number of recipes developed and presented as a learning assignment to groups of children.

2 Introduction of experimental agricultural plots into school gardens to make children learn by observing and doing things.

3. Introduction of 'Spot Training' — an activity conducted by implementers, principals, teachers and parents to find out learning weaknesses of pupils in subjects learnt, and to evolve solutions to overcome them.

4. Supervision and monitoring of student learning and teacher performance with the help of a set of monitoring instruments.

5. Sharing of school resources with the community.

6 A mobile library (library box) and self-learning cards to step up self-learning in children.

7. A wall paper to encourage creativity and dissemination of information.

8. Multigrade teaching methodology.

9. Activities to enlist school community cooperation.

10. Home gardening.

The above activities, innovations and approaches were introduced to project sites, primarily through training and orientation programmes designed and conducted by the NIE with assistance from external resource persons. These included training in classroom teaching and multigrade methodology for teachers, training in school management, including the use of monitoring instruments, for principals, training for parents in agriculture, home gardening, health habits and preparation of a midday meal with locally available cheap materials.

Learning materials required in project activities, such as midday meal preparation assignment cards, monitoring instruments for assessing pupil learning and teacher performance, and self-learning cards, were designed by the NIE, while required equipment and materials were provided by the UNICEF.

The project was implemented on a pilot basis in 50 small primary schools spread over 10 Secretarial Divisions in Sri Lanka, to evolve an appropriate methodology to improve the status of

education in disadvantaged primary schools, which could be replicated in rest of the small schools, after it got refined through experimentation.

The present study, was conducted at the conclusion of the innovative project, to find out how the new approaches and materials have impacted on the status education in these schools

Objectives

The overall aim of this study was to evaluate the effectiveness of the specific activities designed to achieve project objectives. The approach used for this purpose was to determine the extent to which the activities were being followed, and to measure behavioural changes, including learning achievement of children, which may be assumed to have resulted from the activities that were tried out. Consequently, the specific questions which this study sought to answer may be stated as follows:

1. To what extent, have the project activities designed to improve the following aspects, been followed by the personnel concerned?
   (a) Content of learning
   (b) Methods, materials and aids of learning and instruction
   (c) School management practices
   (d) School community relations
2. Has there been an improvement in motivation, in learning achievement and in any other behavioural characteristics of the students?
3. How effective have been the training/orientation prgorammes offered to principals, teachers and parents?
4. What have been the major problems and constraints that had adversely affected project implementation?
5. Are the new approaches suitable for national implementation and, if suitable, what strategies should be followed to ensure their entry into the mainstream, and their sustainability?

Methodology

In order to answer the above questions the following methods and procedures were followed.

Data Collection Instruments and Procedures

The collection of required data was done through the following procedures and instruments:

1. Interviews with principals, teachers, students and parents, and youth using five structured interview schedules
2. Focus group discussions with project planners, implementers, Ministry and Divisional level officials, schools principals, teachers, parents and youths Focus group discussions with school personnel were held at 10 school sites representing 5 Divisions.
3. Administration of year four achievement tests in mathematics and First Language to respective students in all project schools. The same tests as used during the Baseline Survey in 1992 were administered.
4. Collection of data on repetition in all primary classes in respect of the years 1992 and 1996. This data was provided only by principals of 25 schools.
5. Observations in the 50 school sites by 10 observers. using an observation schedule. Apart from this the observers also compiled a report on each school, describing how the project activities were proceeding, affecting the status of education in the school concerned.

Interviews and the observation in school sites and administration of achievement tests were done by a group of 10 persons — senior teachers and master teachers serving in the areas where the schools are. They were given an orientation by the research team.

Members of the research team which visited 10 schools took with them the respective data collection instruments completed by the data collectors and verified the information furnished by them through their interviews and observations. The focus group

discussions and the other interviews with project implementers and officials were conducted by members of the research team. At school site, the research team also spent time on checking the information provided by the data collectors.

Sample of Respondents

Groups of respondents from whom the required data were gathered included principals of all project school numbering 50; two seniormost teachers from each school connected with the project activities making up a sample of 100; two year-5 students from each school making a sample of 100, and two parents from each school community making up a sample of 100, who had followed training programme in agriculture provided under the project. The other respondents included selected NIE staff and education officials at the Ministry and Provincial levels.

Analysis of Data

The data collection procedures employed in this study, yielded both quantitative data (from structured interviews, observations, achievement testing and enumeration of repetitions in primary classes) and descriptive qualitative data (from focus group discussions, interviews and observer reports).

Statistical analysis of quantitative data was done using SPSS for windows. Depending on the nature of the research questions listed previously, it was found necessary to make the following computations:

1. Percentages of respondents opting different responses to questions presented to them.
2. Means and standard deviations of scores (Division-wise) of Year-4 students in mathematics and First Language tests.
3. Repetition rates for the primary cycle (Year-1 to Year-5) in respect of the 8 Divisions for which data was available and the respective rates for project schools as a whole.

Analysis of descriptive data was undertaken primarily with a view to identifying people's attitudes towards the new approaches,

their perceptions of successes and failures, the reasons and why and how they think the new approaches should be continued and extended. This data was also examined to see how they agree with data generated through the structured interviews.

Limitations

It was noted that a considerable number of principals and teachers had been serving in these schools for less than four years, and were therefore, probably not involved in the project activities since their beginning. They may also not have followed some of the training programmes conducted under the project. Some principals were newcomers without may idea of the project. Likewise, some of the parents interviewed, too, had not followed the training programmes meant for them. Consequently, these respondents may not have been fully aware of the nature of project and their responses mayn't be quite reliable. Assessments of principals also appeared to be somewhat exaggerated.

Data related to repetition in project schools were provided in a usable manner only by 25 principals. Reliability of even this data seemed to be questionable, in view of the fact that some schools had failed to maintain records properly.

The observations and discussions conducted by the research team in the 10 schools which they visited, and the observers' reports on the 50 schools, helped a great deal in verification of information gathered through structured interviews, and in gaining an understanding of the real situation prevailing in the schools.

Findings

The most important finding that emerged from this study is that the various innovations associated with the project have received the general acceptance of all concerned — teachers, students and parents alike — as being contextually most relevant and practically most useful. However, owing to several constraints, these practices are not being observed to the same extent and with the same degree of success at all school sites.

Improvements in Contents of Learning

As reported by the principals (Table 1), acquisition of new ty of learning by students has become a common feature in alm all schools. Students as well as observers reported the prese of these features in schools Observer reports revealed tha schools where these activities are carried out with greater succ there is higher school attendance, higher degree of stud enthusiasm and task engagement These reports also revea that in schools where parent involvement was low and teach principal commitment was poor, there wasn't much success w the new approaches.

TABLE 1

Percentage of Principals Reporting Students Engagement in Different Types of Learning

Type of Learning Experiences		*N = 5C Percenta*
Content of Learning		
1.	Students engage in activities of the agricultural plot	84
2.	Students participate in the preparation of the midday meal as a learning event	98
3.	Students attend to their health and physical development activities	86
4.	Students make contribution to wall paper	88
Methods and Materials of Teaching and Learning		
1.	Children engage in observation of the environment as a learning activity	94
2.	Children engage in self-learning activities using library books and self-learning cards	94
3.	Agriculture plot is used as an aid to instruction	98
4	Teachers correct student exercises and offer help to overcome weaknesses	90

Improvements in the Quality of Teaching/Learning

Methods and Materials

Teachers in the project schools were exposed to a numbe short-term training programmes specially designed to equip them with understandings and skills required for them to c

with the various project innovations. It was possible to infer from the views of teachers and observers that the project had exerted a positive influence on the teaching methods and materials used by teachers. Observer reports made specific reference to the following as some of the significant outcomes of the project

1. Student-centered, activity-oriented teaching
2. Use of multigrade methodology as a solution to teacher shortage
3. Evaluation of learning
4. Identification and remediation of learning difficulties
5. Use of instructional aids
6. Engagement in free reading using the library box, use of self-learning cards and observation as a means of self-learning.

The research team's observations revealed two new practices as having a very positive effect on student's reading habits and creative work. These were the practices of using a Library Box and the maintenance of a Wall Paper. The former has promoted reading interest and skills and the habit of reading when the students are free. The latter has served as a simple inexpensive medium through which students could express their creative talents in writing and other expressive art. At one of the schools, two little children invited the research team, apparently with a great sense of pride, to read their compositions displayed on the Wall Paper.

Two other devices that had been introduced with the objective of assisting instruction and learning were the newsletter 'Pelaya' (Plant) and a Calendar. Most teachers were of opinion that the Calendar carrying messages on health and nutrition as well as instructions on self-learning activities could exert a positive influence on students' attitudes and behaviour.

Another outcome of this project is the production of a continuum of essential and specific learning levels that students in Years-2 to 5 are expected to achieve in mathematics and language at each stage of learning. It is said to have been developed on the

basis of experience gained in a number of non-project schools and is expected to serve teachers in teaching as well as in the evaluation of learning outcomes. However, it is yet to be put into use.

Effects on School Management Practices

The Principals' reports on observation of management practices and the uses of management training that have been received suggest that the majority of principals observe appropriate practices related to participatory planning of the schools programme, instructional supervision through the use of monitoring instruments, maintenance of the school agricultural plot and the implementation of the midday meal programme.

Monitoring instruments have proved to be extremely useful in monitoring and improving teacher performance and pupil attainment. The following, comment by one of the principals is quite revealing :

> *It is a very practical and an objective device to assess students' achievement and to identify types of errors made by children. Based on what these instruments reveal about students and teachers themselves, I can now freely engage teachers in reflective thinking leading to improvements in the approaches they observe, for raising the achievement level of students.*

Improved School — Community Relations

The project has made use of several strategies for involving the schools and the community in the activities of each other for mutual benefit. A large number of parents have reported their contribution to school in the form of assistance for implementing the midday meal programme, maintaining the school agricultural plot, and visiting schools as often as possible to discuss matters related to their children's learning and for participating in various activities and functions organised by the school. On the other hand, the schools have also contributed their services to parents in the form of educating them in agriculture, home gardening, nutrition and health, and in making several school resources like agricultural implements available to them. Around 60% of

the principals have stated that teachers visited homes to guide parents in home gardening.

Project Effects on Student Motivation for Learning

Improvements in the quality of the teaching-learning process and contents of learning appear to have had an effect on student motivation for learning. As Table 2 shows, almost all parents (97%-98%) report that their children attend school voluntarily, are interested in studies and do school exercises at home. The majority of the principals and teachers mentioned that the project has succeeded in sustaining student and teacher interest.

TABLE 2

Percentage of Parents Reporting Children's Interest and Engagement in Different Types of Learning Activities at Home

Learning Activities	*N = 100 Percentage*
Interest in Learning	
1. Engage in school work at home	97
2 Attend school voluntarily	98
3. Interested in school work and studies	97
Learning Activities	
1. Engage in home gardening	67
2 Pay attention to personal cleanliness	92
3. Try to keep the garden and environment clean	83

Improvements in Learning Achievement

The many changes introduced and the material inputs provided under the project would be naturally expected to improve the learning achievement of students. Comparison of pre and post project achievement scores in mathematics and First Language of Year-4 students revealed an increase in mean achievement scores in mathematics in 6 out of 7 Divisions, and in Language in 5 out of the 7 Divisions for which comparable data was available. A decline in grade repetition rates in 14 out of the 25 schools also suggests a general improvement in attainment.

There was also evidence of several other positive behavioural changes. Parent reports on behaviour observed at home and project benefits perceived by teachers and principals suggest acquisition of skills related to agricultural practices; personal cleanliness and health; preparation of nutritious meals and social behaviour. Besides, teachers also refer to acquisition of positive values which find expression through student's actual behaviour.

Impact of Training Programmes

More than 85% of the principals have observed that the training programmes benefited them in the acquisition of knowledge and skills related to planning and delegation of school work, instructional supervision through use of monitoring instruments, implementation of the midday meal programme and the maintenance of the experimental agricultural plot. Likewise, more than 75% of the teachers have viewed the training programmes they followed as having equipped them with knowledge and skills required in following the approaches newly introduced into their schools. Almost all parents (98%) have valued the training they received for improving their knowledge of agricultural practices.

A special training methodology, termed 'Spot Training' has been devised for use at the local school level, involving a group of teachers and principals from about five neighboring schools Observer comments as well as focus group discussions held at school sites revealed that this methodology is positively viewed by those who have participated in it. As one of the principals remarked :

> *It is a useful experience for principals and teachers, as it enables them to gain an understanding of learning difficulties specific to students in their schools and to evolve participatively, methods suitable for dealing with them.*

A training manual apparently for use by trainers, seeking to offer a training methodology as well as to define the knowledge and skills required by teachers and principals in the implementation of the new approaches, has been prepared. Its effectiveness is yet to be seen.

Constraints on Effective Project Implementation

Principals and teachers have perceived several constraints on effective project implementation. These included: inadequacy of support from teachers and parents, inadequacy of time for proposed activities; poverty of parents; adverse environmental conditions; non-availability of continuous support and direction from local education officials; weak leadership and commitment of principals; and frequent teacher transfers.

Significance of the New Approaches and Their Appropriateness for Wider Implementation

The new approaches have been viewed by many persons as being most relevant for improvement of education in disadvantaged primary schools in particular, while some have been viewed as relevant to school education in general. There appears to be a general consensus that constraints on effective implementation be overcome and strategies be adopted for ensuring their access into and consolidation within the mainstream of education. A great majority of parents (85%) and observers (90%) have stated that the new approaches should be introduced into all other schools. However, a small number of observers (10%) have argued that they are appropriate only for rural schools in remote areas whose communities depend mainly on agriculture.

The project had also produced several unintended, but beneficial effects It seemed to have contributed towards professional development of NIE staff that was involved in the project, by offering them opportunities to gain insights into problems that exist at the grass roots levels and to work out and implement solutions to these problems. Besides, the knowledge and experience thus, acquired is reported to be of much use in curriculum development work. It was also observed that the project had proved useful in identifying the most critical training needs of teachers and that some action had already been taken to make teacher educators aware of these needs.

Implications of Findings for School Effectiveness

Principal's perceptions, observer-comments and views expressed by principals, teachers and parents during focus group

discussions have consistently highlighted the following features associated with the new approaches, as being most significant and likely to have far-reaching effects on school effectiveness, if properly implemented. These are as follows :

1. Emphasis placed on enrichment of the primary school curriculum with more relevant and meaningful learning experiences in the form of health, nutrition and agricultural education.
2. Introduction of teaching-learning processes which promote child-centered, activity-based exploratory learning and self-learning.
3. Incorporation into the school management system of a mechanism for systematic supervision, aimed at more effective monitoring of student and teacher performance.
4. Focus on active involvement of the community and the school in activities of mutual benefit.

The new approaches tried out have shown their potential for improvement of several aspects of education. This was evident from the higher levels of interest and motivation shown by the participants (principals, teachers, students, parents), higher levels of engagement induced in the participants and positive behavioural changes that occurred among the students. The potential of the interventions, which became thus evident, relates to two important attributes of the new interventions. They were: their relevance to specific socio-economic needs of the people living in the areas where the deprived small schools are situated, and to the needs and characteristics of learners. The approaches designed to improve the content of learning, methods and materials of learning, school management practices and school community relations, have all been viewed as satisfying these criteria.

Features associated with some of the more prominent approaches confirm this view. For example, introduction of a set of monitoring instruments to assess objectively the achievement levels of pupils and teacher performance has been a redeeming feature. Spot Training methodology is a technique designed to enable teachers and principals to jointly examine specific learning difficulties

experienced by children in these areas and jointly search for ways of overcoming them. It has also attempted to the create among parents an awareness of their duties and responsibilities in relation to education of their children. Orientation in multigrade teaching has been welcome as a useful measure to overcome problems created by teacher shortages which most of these schools experience.

The experimental agricultural plot has afforded pupils an opportunity for acquisition of several learning skills such as observation, exploration and inquiry, making learning a live experience. It was also expected to serve as a model for parents to pick up information on the latest know how on agricultural practices for the promotion of home gardens. The midday meal programme was expected to contribute towards improvement in the nutritional status of children, a much felt need of children in these areas, in addition to serving as a learning experience in nutrition and health and an incentive for school attendance.

The Wall paper had become a popular feature giving children an opportunity to express their creative talents. The library box had promoted the reading habit and self study. Another very important outcome of this project, which is likely to have far reaching consequences on the quality of teaching learning processes in the primary schools of the country as a whole, is the development of a continuum of essential and specific levels of learning and associate evaluation instruments in respect of mathematics and language for primary grades. The development of these materials undertaken as a part of the project during the later stages has been completed and their impacts are yet to be observed.

In view of these characteristics, the new approaches have been viewed as most desirable, although they have not been equally successful at all places.

This study has also brought into focus, a number of strategies deemed desirable for ensuring success and sustainability of the new approachers.

Leadership of principals and the commitment of both principals and teachers have been viewed as the most important factor that had contributed the success of the interventions. Hence,

schemes for recruitment, deployment, training and an incentive provision, need to be designed for ensuring that these personnel possess these qualities.

Training programmes intended to develop necessary orientations, understandings, skills and attitudinal disposition should not be once-and-for-all exercises, confined to the project period. Relevant training elements are required to be built into existing teacher education programme ensuring the presence of a continuous supply of teachers with required the know how.

The new approaches seemed to impose additional tasks and responsibilities on principals and teachers because of the failure to integrate and merge project interventions into the existing curriculum and the school management system. Hence, they should be carefully integrated and incorporated into the curriculum and the school management system.

It was also realised that it is essential to keep people's interest alive and sustain a high level of task engagement among school personnel. A mechanism for regular supervision and monitoring by local education officials has been considered necessary in this connection.

Sustenance of certain activities has been found to depend on the availability of continuous supply of a minimum amount of certain types of material resources. Hence fulfilment of the minimum requirement has been viewed as essential for ensuring sustainability.

Another aspect which has been considered critical for ensuring long-term sustainability is the sensitisation of people at various levels — parents, teachers, administrators, policy-makers— through media publicity, to the implications of the project, thereby creating a readiness in them to discharge their respective obligations.

9

Effects of Learning Corner Activities on Learners' Achievement at Primary Stage

Kartikeswar Behera   Gopabandhu Das

The study was conducted with a view to bring about substantial progress in the learners' achievement in the multigrade situation. Assessment of effects of Learning Corner activities on Class III students' achievement was carried out with the help of a single-group Pre-Test and Post-Test design experiment. After a week-long programme of Learning Corner activities in mathematics, language, EVS-I and EVS-II indicated significant gain in all the four curricular areas. The results implied benefits of Learning Corner activities in the multigrade context.

Introduction

There has been a contrywide momentum for the last five years to achieve universalisation of elementary education. A number of programmes have been implemented to ensure quality and equity in elementary education. The educational planners, experts of pedagogy, teacher educators, classroom teachers and personnel of NGOs have extended their hearty support to the fulfillment of this mission. The most vital and effective programme that is being operationalised at present is the District Primary Education Programme (DPEP). It has given a clarion call to the persons working in the field of elementary education across the States to exert their efforts to this noble cause. Besides enrolment, attendance and retention, the learners' achievement

has become the focus of attention now. Minimum Levels of Learning has been put in to practice in the primary schools with a view to enabling all the children to reach at the level of mastery irrespective of caste, sex, socio-economic status and geographical barriers. Time and again the primary school teachers have been oriented in SOPT, MLL, joyful learning programmes and DPEP through organising institutions likes SCERTs, RIEs, IASEs, CTEs, DIETs and NGOs. Training programmes have been conducted in the Blocks and *Panchayats* of the districts The sole aim is to build the capacity of the teachers in the teaching-learning process, which in turn would add to the learners' achievement.

In the traditional classroom practices the children get little scope to put forth their own ideas and thoughts. The teacher-dominated classroom fails to create interest and zeal and thus the creativity of the children is not explored. To ensure active participation of the children, there should be adequate reformation in the methodology for revitalising the teaching-learning process. Unless and until the teachers become pregnant with innovative ideas they can't cater to the classroom needs of the children. Hence there is a crying need to train the teachers in the innovative transactional methodology to ensure satisfactory achievement of the learners. To quote the lines extracted from *DPEP News Letter*, June 1998

> *The main focus of primary education must be on children. Teachers need to discuss pedagogical issues and develop strategies to implement in the school in a collaborative manner. Collaboration needs to include the parents as well in the process. Homework and other assignments become meaningful to the teacher; only when they are properly evaluated and feedback is given. The active participation of the learners in the teaching- learning process and exhibiting the same in the presence of the parents and relatives establishes faith in them They are automatically attracted to the school and feel that schools are really contributing effectively to produce future citizens of India in the way of enriching the knowledge and expanding the understanding abilities of the children In the words of M.S Gore, "Children will not come to the school unless by doing so they find the school attractive. The parents will not require them to attend school unless they find the schools relevant to their daily life.* (A DPEP Newsletter, March, 1996)

Taking the above into heart the Researchers decided to take up study on: effects of learning Corner activities on learners' achievement at primary stage.

Objectives

1. To develop a strategy for orienting primary school teachers in the know how of Learning Corner activities.
2. To help the teachers and students in installing a Resource Room of teaching-learning materials in the school
3. To ensure cooperative learning and small-group interaction.
4. To assess the effects of the Corner activities on the learner's achievement.
5. To involve the local teachers and parents and record their views on the programme.

Hypothesis

1. The Resource Room with locally available teaching-learning materials can facilitate the Learning Corner activities.
2. At the end of the experiment, the Post-Test scores of the learners will differ significantly from the pre-test scores in the subjects dealt with.

Methodology

Sample: Forty students of Class III of Kankoroda Ex-Board Primary School, Ganjam, were selected at random irrespective of their sex, caste and socio-economic status. All were within the age-group of 7+. Eight teachers of primary schools were selected at the time of conducting SOPT programme in the Block. Teachers found to be more active and enthusiastic and resourceful in the conduct of learning activities were selected for the experiment. Expertise in the content areas of the subjects was also a criteria for selection.

Scope: It was decided to conduct subject-wise activities in four rooms identified for Corners. One subject was allotted to one Corner and thus four subjects were

allotted for four corners. The following subjects were taken into account with selected competencies

1.	Mathematic(geometry) competencies	:	5.3.1,5.3 2 and 5 3.3
2.	Language-(Mother tongue) Written Competencies	·	competition 4.3.3
3.	EVS-I-(social studies) competencies	:	3 3 1 3.3 2 and 3.3.3
4.	EVS-II (science)	:	8.3.1, 8.3.2 and 8.3.3

Tools

1 Pre- and Post-Achievement Test in 4 subjects

2 Teacher's self-instructional strategy chart

3 An Observation schedule for collecting information on conduct of Learning Corners

4. Worksheet — for students.

Design

It was a single group with pre-and post-test design.

Stages of Experiment

Stage - I.

One day training for primary school teachers on Corner activities.

1. How to install the Resource Room
2. How to group children on the basis of pre-test
3. How to organise corner activities and make the activities child-centered, through child-to-child approach
4. How to select the teaching-learning materials from the Resource Room according to the competencies
5. Discussion on the competencies and transactional methodology.

Stage – II Conduct of Learning Corner activities under the supervision and guidance of the researchers.

Stage – III. Visit by the teachers of neighboring schools to observe, using the observation schedule developed by the researchers

Stage – IV. Post-test

Stage – V. Meeting of the school teachers and parents to make them aware of the final results of the Learning Corner activities.

Resource Room

It is a room or any secured place in the premises of the school where the teaching-learning- materials collected by the children can be kept preserved for utilising the same during transaction of teaching-learning actitivites.

How the children were encouraged to collect materials:

1. The teacher instructed the students to bring some of their hobby items like postage stamps, drawn pictures, photos and cut pictures from magazines and toys, and puppets.
2. The teacher instructed them to bring anything that had been used and thrown away, like bottles, cap of a bottle, cap of a toothpaste tube, feathers of birds, used packets etc.
3. The learners were instructed to collect dry leaf, cover of co-conut, any fruit, seeds of fruits, old coins, stones, pebbles iron-ore etc.
4. The teacher selected one student leader to assist him in arranging the Resource Room with other students in turns.

Conduct of Learning Corner Activities

Subject: **Mathematics (Geometry)**

Content: Understanding of geometrical shapes and spatial relationship.

Competencies

5.3.1 Recognises and classifies various solids in the environment with their geometrical names, e.g., cuboid, sphere, cube, cone, cylinders.

5.3.3 Draws plane shapes, e.g., square, rectangle, triangle, circle, using objects which have straight and curved edges.

5.3.3 States properties of triangle, rectangle and square

Transactional Methodology Adopted· Demonstration

Technique: Paper-folding, cutting pieces of cardboard into geometrical shape and sizes.

Teaching Aids: Paper packets, chalk, packets of wood, match box, matchsticks, tins, bottles, leaves of tree drawing-paper sheets, pencil, scale card board, scissors and thread.

First the teacher demonstrated to the whole group and then the High achievers demonstrated before their friends as the allotted group. The researchers observed the activities and made necessary corrections and added suggestions in the presence of the teacher. Then group work followed. Each and every student of the group was given a chance to explain any point relating to the competencies.

Language: (Mother tongue) It was in Oriya

Competence· Writing

Specific 4 3.3. Write a simple, guided composition.

Competence: (a) Writing letters

(b) Writing stories from pictures

Aids Selected from the Resource Room

Written post cards, inland letters, envelopes, picture cards.

T.L. Strategies for Writing Letters

- Distributing written letters among the students.

- Asking them to go through the letter silently for 5 minutes.
- Distributing the following format and giving instructions to fill up the columns.
- Collection of filled in formats and discussion on these.
- Giving individual assignment of writing a letter.

Worksheet to be filled in by the learner :

	Question	*Answer to the question giving (✔) tick mark* Yes	*Answer to the question giving (✔) tick mark* No	*Write answers in words and sentences to 'yes' responses*
Q-1	Is the place and date written?			Place : Date:
Q-2	Is the letter addressed?			Dear ....
Q-3:	Is there good wishes or Namaste?			Pranam/ Namaste/ hearty greetings/good wishes
Q-4:	Do you find the matter of the letter.			Write the matter. ...
Q-5:	Is the letter ended in words like yours affectionately, sincerely?			Yours sincerely, Yours affectionately, Yours lovingly, ...
Q-6	Is there the name and address of the sender?			Name : At/PO : Dist : Pin :
Q-7.	What is the address of the person to whom the letter is sent?			Name : At/PO : State : Dist : Pin :

Writing Stories Basing on the Picture Cards

Some picture cards were presented before the learners. Each learner was given scope to tell some thing on a particular picture. At a stretch, five pictures were presented in a sequential order. The facts relating to all the pictures form a complete story Then each child was given picture cards and was asked to write a story in ten sentences basing them on the set of pictures. The high achievers assisted the low achievers according to the instruction of the teacher.

EVS-1 (Social Studies)

Content: The pupil knows about various people at work and appreciates the importance of the world of work

Competencies

3 3.1 Lists the occupations of people engaged in producing various articles of daily need.

3.3 2 Identifies those who produce foodstuffs, e g., farmer, dairyman, fisherman and herdsman.

3.3.3 Describe their main activities and their way of life

Educational Methodology: Role-play and Action Song

Roles were distributed among the individual learners. The teacher directed the learners to play their respective roles with dialogues and songs (composed by the researchers) befitting to the competencies. After the role-play was over, questions were asked from the learners, and remediation was provided to the low achievers through the high achievers, under the supervision of the teacher.

EVS - II (Science)

Content · Living things their characteristics and classification

8.3.1 Observes local surrounding and classifies thing into:

(i) Living and Non-living

(ii) Natural and Man-made

8 3.2 Understanding similarities and difference between animals and plants.

8.3.3 Identifies main parts of a plant.

Methodology Activity-Demonstration, pair work and group work.

Stages:
1. Collection
2. Classification
3. Comparison
4. Analysing
5 Drawing Inferences.

The students were directed to go to the Resources Room and bring any material they like They were given five minutes time to do so. The teacher guided them. The materials were kept on the ground within a circle. Then they were distributed format-based worksheets. They were asked to answer the questions as per the format. The high achievers assisted the low achievers to work out the assignment.

Format to Be Filled in by the Learners

S No.	*Name of the Object*	*Natural*		*Man-made*
		Living	*Non-living*	
1.				
2				
3				
4.				

After observing write similarities/differences

S. No	*Name of the Object*	*Natural*		*Man-made*
		Living	*Non-living*	
1.				
2.				
3.				
4.				

Each learner was given the opportunity to read out his answers. Then a question-answer session was organised. The High Achievers first put questions to the low achievers and they answered in their own ways The researchers observed the sessions and remediation was made available for the low achievers through the teacher and the high achievers.

Evaluation

A Post-Test was conducted covering all the competencies of the four subjects. The questions covered all competencies and were of the objective type, namely, multiple choice, fill up the gap, correct the error, what comes next in the serial, matching items and short answer type questions. The questions were prepared by the expert staff members of the DIET, where the researchers are working. The answer papers were also valued by the selected panel of examiners. The performance of the Pre-Test and Post-Test is reflected in the table given below.

Analysis and Findings

The findings of the study are reflected in the tables.

TABLE 1

No. of Students	*Subjects*	*Pre-Test Mean*	*Post-Test Mean*	*Gain in the Score of the Post-Test*
40	Mathematics (Geometry)	9	23	14
40	Language	8	18	10
40	EVS-I	11	20	9
40	EVS-II	10	21	11

It is evident from Table 1 above that the mean score of mathematics in the Pre-Test was 9, but it was increased to 23 with an average gain of 14. With regard to language, the mean score was 8 in the Pre-Test, but it was raised to 18 at the Post-Test with average gain of 10.In respect of EVS-I the mean score was 11 at the Pre-Test stage but it was raised to 20 in the Post-Test with an average gain of 9 As regards EVS-II the mean score in the Pre-Test was 10, but it was raised to 21 with an average gain of 11 in the Post-Test.

It is quite clear from the Post-Test result in all the four subjects that there has been substantial gain in the mean score of the Post-Test.

TABLE 2

N	*Subjects*	M_D	SD_D	SE_{MD}	*'t' -Value*	*Remarks*
40	*Mathematics*	*14*	*11 8*	*1.86*	*7.52*	*Significant at 0.01 level*
40	Language	10	10.26	1.62	6.17	-do-
40	EVS-I	09	9.35	1.48	6.08	-do-
40	EVS-II	11	11 33	1 79	6 15	-do-

Note, N = No. of sample
M_D = Mean of Difference
SD_D = Standard deviation of difference
SE_{MD} = Standard error of mean of difference

Since the problem is concerned with the significant of difference between means obtained from the same test administered to the same group upon two occasions, the researchers through it appropriate to use 't'-value here to determine the mean difference between two tests i.e., Pre-Test and Post-Test.

It is evident from Table 2 given above that the mean difference of Pre-Test and Post-Test in mathematics is 14 But from Table 2 it

is noted that the obtained 't'- value is 7.52 and is much higher than the table value of 't', at 0.01 level of 2.72 at 39 df. (degree of freedom). Thus, there is no doubt that the mean gain of the Post-Test is more than that of the Pre-Test and stands significant

If one glances at the difference in mean gain score of language, it is 10 and the obtained 't'-value of 6.17 is larger than the table value of 't' at 0.01 level of 2.72 at 39 df Thus the score proved to be significant. In respect of EVS-I, the mean difference in the gain score is 9 at the Post-Test-stage When it is tested by using 't' its value is 6.08 which is higher than the table value of 't' at 0 01 level. So the gain score stands significant.

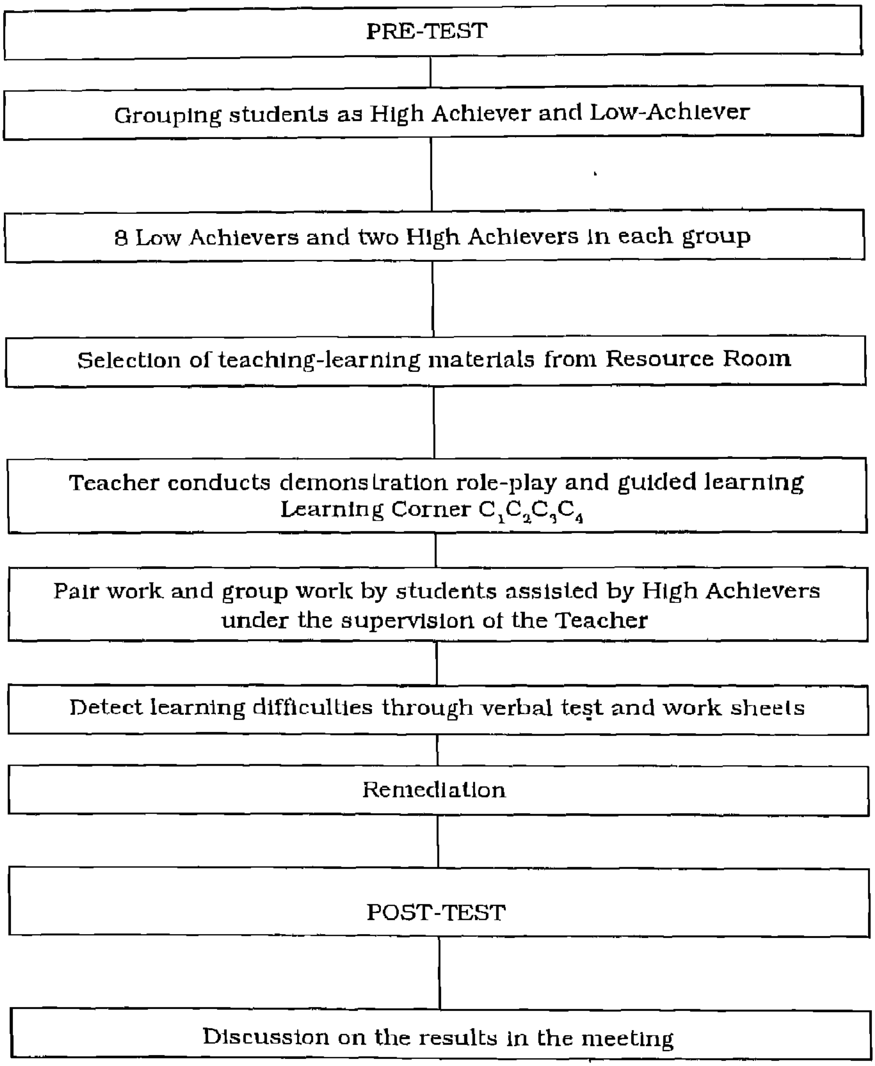
As to the mean difference in the gain score of the EVS-II (science) it is 11; when the 't'-value is computed it is found to be 6.15 which is more than the table value of "t' at 0.01 level and stands significant.

The researchers having applied statistical technique found the gain scores at the Post-Stage significant and thus, the stated "hypothesis" that the "Post-Test score of the learners will differ significantly from the Pre-Test scores" is retained.

Educational Implications

1. Corner activities provide scope for the teacher and the learners to work with participatory zeal.
2. A Resource Room can be developed in every school which will help in the day-to-day classroom teaching-learning process.
3. The three-way communication, i.e., teacher educator to teacher, teacher to learner, and learner to learner adds to the proficiency of the teacher and builds capacity which in turn will help in developing competencies in the learners.
4. It makes the students active, free and creative as they get involved in the teaching-learning process not compulsorily but of their free will.
5. It provides ample scope for small-group interaction and peer-tutoring.
6. These strategies are helpful in the multigrade context
7. Involvement of parents in the school programme can strengthen the school community relationship.

Self-Instructional Strategy Chart for Teachers



Findings of Observation Schedule

S	Items of Observation	Excellant	Good	Fair	Poor
1	How was the arrangement of corners?	14	6	-	-
2	How was the installation of Resource Room?	12	6	2	-
3.	How was the Demonstration?	16	4	-	-
4	Individual work	12	4	4	-
5.	Group work	12	4	4	-
6.	Pair work	15	4	1	-
7.	Teacher-guided learning	16	4	-	-
8	Self-learning	10	6	4	-
9	Supervision	15	5	-	-
10.	Management of timing	12	8	-	-

Note. Twenty teachers were selected to observe each corner and exercised their remarks judicially.

SECTION III

Improving the Teaching-Learning Process

The studies discussed in this section include:

- Creative Activities: A Strategy Towards Learning Achievement
- Identification of Misconceptions Related to Astronomical Beliefs at Primary Stage and Intervention Strategies — A March towards School Effectiveness

10

Creative Activities: A Strategy Towards Learning-Achievement

J.S. Padhi

The study aimed to explore how creative activities in primary classrooms had impact on learning achievement. The objectives of the study were to organise subject-related concepts in a blended form for creative activities; to develop divergent thinking in the learners through these activities; to help the learners to learn concepts through these activities; and to train the learners for carrying out self-learning activities. The study was conducted on 42 children of Class II. The findings of the study revealed that nearly all the learners achieved learning to an expected level. The learners were motivated and in their own individual capacities carried out activities during the unsupervised period.

Introduction

There have been extensive and intensive experimentation, development and intervention programmes tried throughout the world in the recent times to make the teaching-learning process effective in the primary classes. In India, a large number of educationists, teachers and researchers have attempted to uplift the quality of classroom processes. Still they are under attack as they could not provide a definite solution to the problem. The country has placed tremendous faith in the education system for the development of the individual. In the recent years, the primary school has multiplied itself in number but the quality of the teaching-learning in the classroom has gone down and the realisation of the school objectives has become remote.

Obviously, a large gap has arisen between what happens in the classroom and what should happen.

The existing state of classroom interventions is well known. The entire curriculum transaction is built around the textbook. Our primary teachers are mostly rule-bound, rigid and stereotyped. They emphasis the single correct unimaginative solution to problems and expect responses in the prescribed manner. They forbid spontaneity and crush the joyful inquisitiveness and imaginary responses of young children. They ask for structured and closed-type answers written in the book. In short, the existing teaching-learning is text-bound and teacher-bound and results in the development of narrow range of a abilities in our children.

A Rational Approach

In order to improve the achievement of the learners in school subjects and to develop finer abilities in our children, a rational approach in classroom teaching in essential. The theory of creativity that has emerged during the last few decades offers a realistic approach in the classroom that appears natural for development of a wide range of abilities and subject competencies amg the children. Development of creativity in children has long been a prime purpose of education. Perhaps, what is new is the growing realisation that creativity is not the advantage of the chosen few, but a basic human endowment present among all in different measures. The importance of creativity in the education of the child has long been felt by the educationsists of the country. The reports of the Education Commission (1964-66), the *National Policy on Education (1986)* and *Programme of Action (1992)*, the *National Curriculum for Elementary and Secondary Education – A Framework (1987)* have all along emphasised the need to develop in the child spontaneity, curiosity, independence in thinking, originality, courage to ask questions, scientific temper and, in short, creative thinking skills and abilities. The child-centred approach to education, as articulated by the National Policy on Education, implies creative approaches to teaching and learning, which are natural ways of learning for young childen. Creative teaching-learning provides opportunities for children to think, feel, imagine, inquire, play around with

numerous possibilities, test ideas against the facts, and so on. A creative teaching-learning process is friendly, informal, non-threatening, accepting, motivating Studies have shown that creative thinking-learning contributes to students' involvement and participation in creative activities and a liking for the school. These make the teaching-learning process more responsive to children's potentialities and thus may enhance among other things 'learning to learn'

This greatest asset of human beings is grossly neglected in our classrooms The creative talents are not nurtured in our schools, especially in large-sized classes and multigrade settings The apathy to creative teaching may be due to the ignorance of the average primary teacher, rigidity in the education system, lack of adequate research in developing teaching technique, and failure in the administration in diffusing new methods (Kothari Commission, 1964-1966). Experts in the field opine that subject-related creative activities ensure joyful, self-motivating, effective learning and develop divergent thinking abilities among the children. To prove this view, numerous intervention programmes have been developed to make learning meaningful but creative teaching-learning has an edge over the others in many respects. In this process of learning, the thinker is led to restructuring of ideas It improves imaginative power, problem-solving ability and self-expression.

In view of the above, the investigator has attempted this study as described below.

Objectives

The major objectives of the study were to :

- Organise subject-related concepts in blended form for creative activities
- Develop divergent thinking in the learners through these activities
- Help the learners to learn the concepts through these activities
- Train the learners for carrying out self-learning activities

Methodology

Design

In this study subject-related creative activities are the independent variables and the learning achievement, divergent thinking and extent of self-learning ability are the dependent variables. Single group post-Test design is used in the study.

Sample

Forty-six learners (28 boys and 18 girls) of Class II studying in a rural school in the DPEP district of Dhenkanal, Orissa, constituted the sample of the study

Procedure Followed

1. Creative activities could be developed in each subject area separately for achievement in learning and divergent thinking. In the present study, fitting to the multigrade situation and economising on the time and energy of the teacher, blended concepts of different subjects of Class II were identified. On the basis of these contents, different concepts of creativity emerge, such as verbal creativity, figural or non-verbal creativity, scientific creativity, literary creativity, artistic creativity, etc. The concepts, subjects and the aims of each creative activity are shown in Table 1.

TABLE 1

Objectives of Each Creative Activity through Blending of Concepts Derived from Different Subject Areas

Concept	*Subject Area*	*Aims of the Creative Activity*
1. Clothes	Language Env Studies Mathematics Art Education	Learn to make words Frame words of EVS and draw pictures Guess the cost of the clothes Decoration through pictures of clothes
2 Houses	Language Env. Studies Mathematics Art Education	Learn to make words Draw different types of houses Use geometrical figures Decorate the houses

Concept	*Subject Area*	*Aims of the Creative Activity*
3. Animals	Language Env. Studies Mathematics Art Education	Writing of words Usefulness of the animals Learn shapes and sizes Draw and colour the pictures
4. Public Buildings Places/	Language Env Studies Mathematics Art Education	Speak and write simple sentences Use of public places Learn distance— far and near Drawing of market-place
5. Coins/ Currency notes	Language Env Studies Mathematics Art Education	Understanding oral instructions for carrying activities Purchase of articles through money Mathematical skills using coins and notes Making drawings of coins and currency notes

2. On the basis of above planning, different concept-related creative activities such as product improvement, square test, consequences, circles, unusual uses, completion of pictures, asking questions were developed. These activities were conducted in three different conditions. They were teacher guided, teacher supervised, and without teacher-supervision situations. The creative activities for learning concepts under the above situations are presented in Table 2.

TABLE 2

Details of Creative Activities Conducted for Learning Achievement

Teacher Guided Activity	Creative Activities	
	Teacher Supervised (20 mnt. time allowed)	*Without Teacher (No time limit)*
1. Clothes Pupils were asked to tell about different types clothes they wear in different seasons, materials used in the clothes. The teacher also adds some more words to make pupils understand the game.	Pupils were asked to write as many clothes that they can purchase by paying Rs 200.	Pupils were asked to draw and colour different types of clothes.

Teacher Guided Activity	*Creative Activities*	
	Teacher Supervised (20 mnt. time allowed)	*Without Teacher (No time limit)*
2. Houses Pupils were asked to write about different types of houses that they know.	They were asked to list the possible materials used in those houses A sheet of paper	containing 20 squares were given to the pupils to draw different types of houses—as many as possible keeping square as a part of it
3. Animals Pupils were asked to name the animals and birds that they know.	Pupils were asked to think of and write the number of ways that the domestic animals are helpful to us.	Pupils were asked to draw the pictures of animals and birds keeping the given oval and circles as elements.
4. Public Places/ Buildings Pupils were asked to name the public places/ buildings that are in their neighborhood, and the main activities there.	Teacher asked the pupils to write other activities that they could do at school apart from reading	Pupils were asked to draw pictures of a market-place showing different shops.
5. Coins/Currency notes Pupils were asked to write about important materials purchased by with money	Pupils were asked to write different combinations of coin/notes to make two rupees	Pupils were asked to draw and label different coins and currency notes

3. The teacher initiated the activities for each concept giving directions as follows:

> *Today let us play some interesting games. They will give you a chance to use your imagination. Remember, this is not a test. There is no wrong or right answer. So work on your own and let us see how many ideas you can think of. Feel free to give as many responses as you can. Give those kinds of responses which nobody else in your class can think of giving. Make your responses clever and interesting. In case you run out of ideas do not give up. Continue to think and you may have some more ideas that you can add to your list. Try to work as fast as you can.*

The environment was joyful, because of game-like situation for eliciting divergent and newness in thinking for each activity Emphasis was given to think all the things in the world around them.

4. The pupils were provided sufficient time for learning and carrying out their independent activities with novel ideas It was ensured that each pupil could follow the directions, the task to be undertaken and the way responses were to be given Therefore, for each creative activity the sequence 'Teacher guided activity—Teacher supervised activity—self-learning activity' was followed.
5. During the experiment, the teacher encouraged self-thinking and free flow of a large number of unrepititive, flexible and uncommon responses of the pupil Whenever any new ideas were shown by the pupils, they were reinforced The pupils were instructed to carry on their thinking even after the school hours.

Results

The responses given by the pupils in all the five activities were scored for number of correct responses (fluency) and classes of responses (flexibility).The responses were not scored for originality and elaboration, the other two creative abilities, as they were not in the purview of the study. In view of the objectives specified earlier, the data obtained were analysed

Development of Divergent Thinking

In order to study the above objective, each activity had ten flexibility categories and the responses were given flexibility category numbers according to their belongingness The mean flexibility scores of all the teacher supervised and unsupervised activities were computed. Divergent thinking score is equated to the flexibility score as assumed in the experiment The mean divergent thinking scores of each concept are presented in Table 3.

Table 3 reveals that the mean divergent thinking score gradually increases from concepts 1 to 5 in both teacher-supervised and self-learning sessions This means divergent thinking of the

TABLE 3

Mean Divergent Scores of the Concepts (N=46)

Concept	Teacher Supervised (Verbal Flexibility)	Self-learning (Non-verbal Flexibility)
1 Clothes	4.38	4.00
2. Houses	4.46	4.50
3. Animals	4.51	4 62
4 Public place/Buildings	5.01	4.65
5 Coins/Currency notes	5 02	5 50

pupil increases when the creative activities are conducted in the class during both the sessions. The teacher-supervised activities were mostly verbal and the self-learning activities were figural in nature Though the mean divergent thinking scores in verbal and non-verbal activities are numerically similar, the range of verbal divergent thinking is less in comparison to figural thinking It can be concluded that the learners can improve their divergent thinking ability through subject-related creative activities.

Learning Achievement Through Creative Activities

To study the extent of learning concepts through creative activities, criterion levels of learning for each concept were fixed. They were the number of correct responses in both the situations (teacher supervised and unsupervised). The criterion level for each concept was fixed based on mastery of level learning Responses given by the pupils in both verbal and figural activities were scored for their correctness Each correct response was allotted I mark, termed as 'fluency score'. Judgments of mastery and non-mastery were made based on the criterion level learning of the concepts. Percentages of attainment of mastery in both the situations are shown in Table 4.

Table 4 reveals that more than 80% of the learners have achieved the mastery-level learning in the concepts Clothes, Houses and Public Places/Buildings in teacher-supervised sessions. The learners are below the criterion level achievement in concepts Animals and Coins/Currency Notes. The reason may be pupils

TABLE 4

Percentages of Mastery (Concepts Learned)

Concept	Teacher Supervised (Verbal Learning)	Teacher Unsupervised (Figural Learning)
1. Clothes	80.3	82.1
2. Houses	81.1	92.5
3. Animals	78.2	95.1
4. Public place/Buildings	85.5	79.3
5. Coins/Currency notes	60.3	96.4

are less exposed to the domestic animals and are not given opportunity to transact money in the market. Their performance may be due to lack of training in such activities. In self-learning sessions, the performances of the learners is tremendous and is above the 80% criterion level in all the concepts. This means most of the learners are masters in their figural creative activities and they are better than in verbal activities. That the verbal learning is less in comparison to figural learning may be due to lack of self-expression in the learners' language. It can be inferred that the pupils performed better under self-learning situations and in figural activities. Through language training their self-expression can be improved.

Pupils Carry out Independent Activities

One of the objective of the study was to train the pupils to carry out their learning activities independently. The pupils become self-motivated, self-expressive, and self-confident by suitably prepared creative activities. It helps them to carry out their learning activities without help and supervision. It is found that the pupils were ignorant or not trained to do independent activities and unsupervised activities at the beginning. Thirty-six out of forty-six pupils needed initial help and guidance for self-thinking, and self-motivation to diversify their thinking in all the directions. When the experiment continued, the pupils got trained gradually in what was expected of them. Towards end of the experiment it was found that about six of the pupils still needed guidance to carry out their learning activities. The

other forty pupils were trained to a large extent to respond to these creative activities on their own It can be inferred that if more creative activities are conducted and become a part of the teaching-learning process, almost all the pupils will be trained to carry out their learning activities.

Major Outcomes

These are some of the major outcomes of the study ·

1. Concepts of various school subjects could be blended and integrated to form conjugate concepts Appropriate activities (verbal and figural) could be planned for attainment of the concepts. The creative activities are to be meticulously developed, sequenced and conducted.

2. Divergent productive thinking (verbal and figural)in the pupils was developed gradually from activity 1 to 5 through these activities Development of figural divergent thinking is quicker in comparison to verbal divergent thinking. The increasing trend may continue for some more activities

3. Pupils have learned the concepts up to the mastery level or approximate to that in both types of activities. The deficit may be due to deficiency in expressive language and exposure

4. More learners were gradually self-motivated and were engaged silently in their activities even during the unsupervised period.

Implications Of Findings For School Effectiveness

The outcomes of the study have the following implications for the school effectiveness:

1 At the primary level, teaching of both facts and as well as thinking processes is equally important. Therefore, the teacher has to analyse the content of each school subject and decide which topics are more suitable for the development of convergent and critical thinking abilities and which units can be used more effectively for the development of creative thinking abilities. While selecting the topics from different subjects for creative teaching the teacher will have to consider the age and grade of the students, nature of the subject, abilities to be developed and objectives to be achieved. Further,

as the teacher becomes resourceful, he develops his abilities and prepares activities for divergent responses, uses wasteful, familiar objects as teaching-learning medium and plays the role expected of him.

2. The pupil gives voluntarily a large number of responses that are flexible and uncommon and may be new to the group. He/she draws a number of pictures and figures of his/her interest. There is continuous flow of ideas to record without wrong or right answers The process deals with concrete and friendly items, developing self-confidence, motivation for self-learning and independent thinking. A creative relationship between the teacher and the pupils is established.
3. The learning environment in the class becomes game—like, enjoyable, self-paced and learner-centered. The pupils are self-motivated so that their divergent thinking continues even after school hours
4. Looking to the problems of large-sized classes, this strategy seems to be more appropriate. Individualisation is taken care of and the teacher is less pressed.
5. In the multigrade situation, where the teacher runs short of time, unsupervised time for one class can be used for supervision of other classes.

It can be concluded that use of creative activities for learning achievements is more relevant for large-sized classes and multigrade situations. Fluency and flexibility will be automatically included in most of the teaching-learning strategies. Even then some strategies can be devised which particularly aim to promote fluency and flexibility. These will include: (a) giving uses, (b) suggesting improvements, (c) working out consequences, and so on. As a technique brain storming is very suitable for promoting fluency and flexibility.

Teachers indeed must be prepared to promote creativity in children. Creativity must find a key place in the regular teacher training programmes in India . However, merely including a topic of creativity in the teacher training curriculum is not enough. Prospective teachers must also be prepared to use creative approaches in their practice teaching.

11

Identification of Misconceptions Related to Astronomical Beliefs at Primary Stage and Intervention Strategies — A March Towards School Effectiveness

M. Mohapatra

The author aimed at studying the misconceptions related to astronomical concepts at the primary stage. The objectives of the study were· to identify misconceptions related to astronomical concepts; to identify strategies to overcome prevalent misconceptions; to design a diagnostic tool for identification of misconceptions, and to prepare remedial teaching strategies to see its impact. The study was conducted on 129 students of Classes IV and V. The interview mode was adopted to know the views of students on astronomical concepts. The data was analysed to see the misconceptions Based on the results, remedial teaching lessons were prepared.

Introduction

In spite of the fact that curriculum at the primary level has to be contextual, some amount of regimentation still persists in its core framework. Astronomy is viewed as an important and essential part of this core component of any primary science curriculum (Sharp, 1996). In the above perspective, concepts of astronomical objects and astronomical events are taught at the primary stage. Analysis of primary curriculum and textbooks reveals that in India, the pupils at primary stage are exposed to such concepts in astronomy as Earth, Sun, Moon and Stars. The children have a natural tendency to observe the sky; they not only wonder about it but also construct concepts about these

concepts This self-conceptualisation of the concepts may act as a critical barrier (Hawkins, 1978) for what he/she reads from the textbooks or learns in the classroom. This critical barrier may lead to misconceptualisation. Studies do indicate several of these misconceptions of the children (Nussbaum and Novak, 1976; Mali and Howe, 1979; Vosidou and Brewer, 1990, 1992). Let us consider a very simple example: A child on observing the night sky sees the stars to be very small as compared to the moon. However in the class the teacher tells that the stars are very large compared to the moon. This initiates a cognitive conflict. A child wonders: which one is true? To overcome this dilemma which leads the child to misconception, two possible ways may be suggested:

- To help the pupil, the teacher has to find out some teaching strategies centered around child's experiences.
- The textbooks may be written as a self-learning material with all possible explanations, focussed on contextualities.

The purpose of the present study is based on the basic problem.

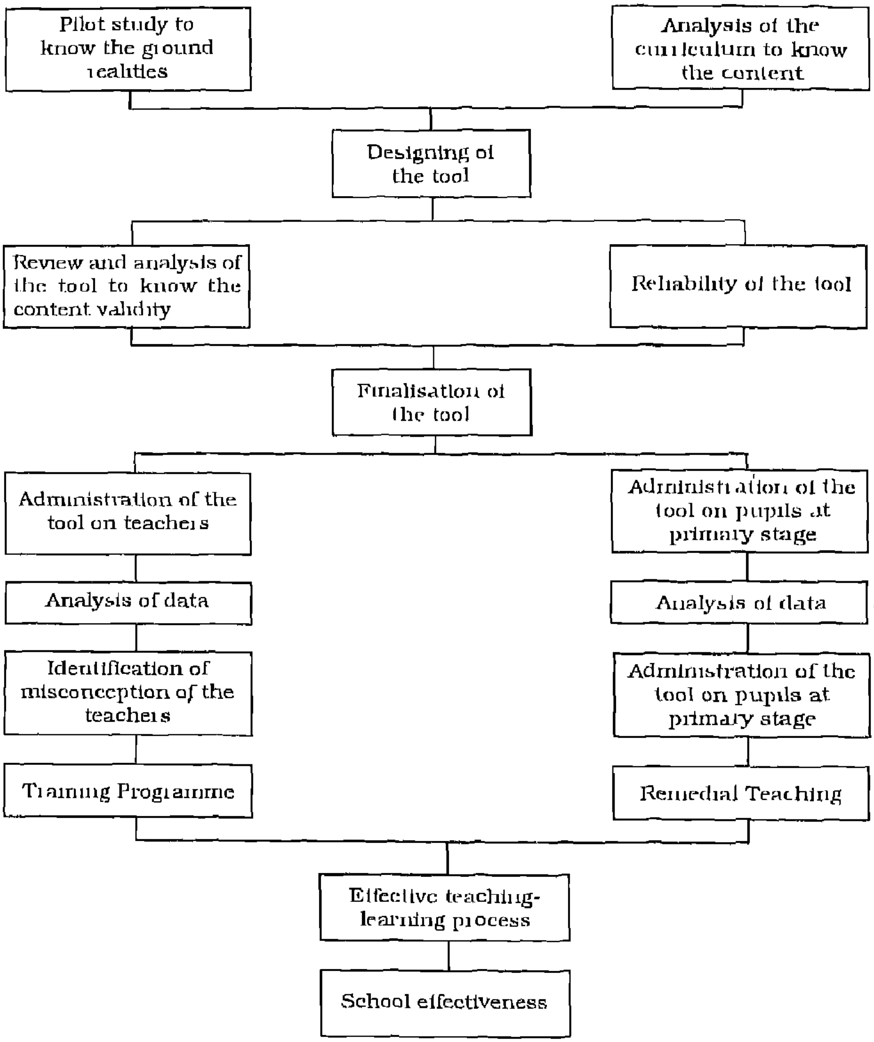
- How to identity the misconceptions.
- How to design/formulate strategies to overcome misconceptions, thereby improving the achievement level of the pupils which will enhance the school effectiveness.

The conceptual model of the work is given in Fig. 1.

Objectives

- To design a diagnostic tool for identification of misconceptions related to astronomical concepts.
- To prepare teaching strategies for remedial teaching in the intervention areas and to see the effect of remedial teaching.
- To identify misconceptions of the prospective teachers about astronomical concepts based on which training programmes and textbook preparation may be suggested.

Fig 1: Conceptual Model of the Work



Methodology

Sample

The sample for the present study consists of 129 pupils at primary stage reading in the D.M. School Bubaneswar and 22 prospective teachers from RIÉ, Bhubaneswar. Table 1 presents the demographics of the sample.

TABLE 1

Demographics of the Subjects

Sl No.	School/Institution	Class	Boys	Girls	Total
1	D M School	IVA	24	10	34
2	D.M. School	IVB	22	10	32
3	D M. School	VA	22	11	33
4	D.M School	VB	20	10	30
5	RIE	B.Sc, B.Ed IV year	10	12	22

For knowing the effect of remedial teaching, Class V pupils were considered. Due to absenteeism, those who were present during administration of tests and had undergone remedial teaching were considered for the study. The B.Sc, B. Ed Year IV students, i.e., the prospective teachers were taken as the sample because:

- of the availability of a such a sample of prospective science teachers,
- they had already completed six-week of practice-teaching in schools, and
- in few months time they would be ready to take up teaching jobs.

Tools

Before preparing the tool to know the ground realities, a personal interview of 20 pupils reading in Classes IV and V were conducted. The pupils were selected randomly, ten from each class, reading in the DM School, Bubaneswar. The personal interview gave a clear picture of their conceptualisation about astronomical beliefs.

The MLL curriculum along with and the science textbooks published by NCERT were analysed to know the astronomical concepts the pupils of the primary stags reading in Classes IV and V are supposed to know. The MLL curriculum was taken for analysis because this curriculum is followed in the D.M School Based on the responses and the curriculum analysis, a pencil-on-paper test was designed. The tool was reviewed and refined by a group of experts so as to maximise its context validity. The reliability of the tool was assessed by using the split-half technique. The reliability coefficient obtained was .86 and can be graded as highly reliable.

The tool consists of ten items. The item Nos. 1,2,3,5,6,7 are with pictorial presentation and the rest are without pictures.. The questions are related to. (1) Shape of Earth, (2) Position of people on Earth, (3) Relative size of Moon, Earth, Sun and Stars, (4) What is Sky, (5) Position of clouds above Earth's surface, (6) Shape of Sun, (7) Shape of Stars, (8) Cause of day and night, (9) Natural satellite of Earth, (10) Shape of Moon.

As an example let us consider Question No. 2 of the tool.

Question: On which portion of the Earth people live.

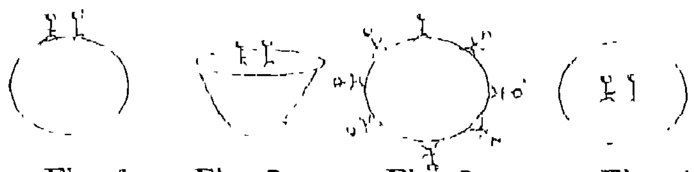


Fig 1 Fig. 2 Fig. 3 Fig. 4

(a) People live on the north pole of the Earth as shown in Fig. 1

(b) People live on a flat upper surface of the lower hemisphere as shown in Fig.2

(c) People live on the surface of the Earth as shown in Fig. 3.

(d) People live inside the Earth as shown in Fig. 4

The pupils are supposed to give a tick mark in the box for the right answer.

Administration

The developed tool was administered on the whole sample. The maximum time allowed to complete the test was 35 minutes.

Intervention

The data was analysed to see the misconceptions. Basing on the result, a remedial teaching lesson was prepared Class V pupils were taken for remedial teaching. An activity-based child-centered teaching strategy was adopted so as to stimulate the thought process of the child and enable the child to seek and discover knowledge. For this purpose, a model containing Earth, Moon and Sun was used. The following concepts were demonstrated.

- Shape of Earth
- Shape of Sun
- Shape of moon.
- Rotation and revolution of Earth and Moon.
- How day and night occur?
- What are the position of people and clouds on Earth.
- Relative size of Sun, Moon and Earth
- Appearance of changing shapes of Moon.

The following concepts were explained using diagrams.

- The diagram for Stars, Sun given in the books and the real shapes. Only explanations were given for the following:
- What is Sky?
- Why Stars appear so small?
- Man-made satellites and natural satellites

A time-gap of fifteen days was allowed between the remedial teaching and administration of the post-test.

During the remedial teaching, the pupils were enthusiastic and interacted with the test administrator freely. During the interaction the following interesting questions were put by the students—

- Sun and Moon exhibit rotational motion like Earth or not.
- If Sun will die what will happen?
- Why we are not falling from Earth surface? If we fall where will we go?
- What is horizon?
- What makes the Sun glow?
- What is a rainbow and how it is formed?
- What will happen if Earth will not have gravitation?

All these questions were properly explained and discussed.

Analysis

Class-wise, the mean score and standard deviation are tabulated in Table 2 for the whole sample. For Class V the mean score and standard deviation before and after remedial teaching are tabulated in Table 3. The percentage of correct response question-wise for different classes is given in Table 4, and using the data of Table 4 the percentage of correct response question-wise is depicted in Fig.2. Table 5 represents the percentage of correct response of Class V pupils before and after remedial teaching. The same data is depicted in Fig.3.

TABLE 2

Mean Score and Standard Deviations Class-wise

S.No.	*Class*	*Mean Score*	*Standard Deviation*
1	IV	2.939	1.487
2	V	3.761	2.613
3	B.Sc. B.Ed.	6.363	2.479

TABLE 3

Mean Score and Standard Deviations for Class V Before and After Remedial Teaching

	Mean Score	*Standard Deviation*
Before	3.76	2.61
After	7.03	2.57

TABLE 4

Percentage of Correct Response Question-wise for the Total Sample

Question	*Class*	*Percentage*
1.	IV	16.9
	V	34.9
	B.Sc. B.Ed.	72.7
2.	IV	44.6
	V	69.8
	B.Sc. B.Ed	72.7
3.	IV	32.3
	V	31.7
	B.Sc. B.Ed	72.7
4.	IV	23.0
	V	30.1
	B.Sc. B.Ed.	68.1
5.	IV	40.0
	V	38.0
	B.Sc. B.Ed.	77.2
6	IV	9.2
	V	15.0
	B.Sc. B.Ed.	27.2
7.	IV	13.8
	V	14.0
	B.Sc. B.Ed.	31.8
8	IV	33.8
	V	34.0
	B.Sc. B.Ed.	90.9
9.	IV	56.9
	V	71.4
	B.Sc. B.Ed	72.7
10	IV	26.15
	V	38.00
	B.Sc. B.Ed.	50.00

TABLE 5

Percentage of Correct Response Question-wise for Class V Before and After Remedial Teaching

Question Number	*Percentage Before*	*Percentage After*
1	34.9	71.4
2	69.8	96 8
3	31.7	66.6
4	30 1	55.5
5	38.0	90 4
6	15.8	68.2
7	14.0	57 1
8	34 0	63.4
9	71.4	84.1
10	38.0	90.4

From Table 2 it is clear that mean score of the pupils increases with increase in chronological age. It also can be concluded from Table 2 that prospective teachers also have misconceptions as the mean score is only 6 36 out of ten. An interview was conducted to assess the poor performance. The prospective teachers were of the opinion that neither these concepts are written clearly in the textbooks nor the teacher had given an adequate explanation. Misconception like Stars having a five-pointed projection like a starfish prevails with the B Sc. B. Ed. students, 30% of the B Sc B. Ed students have the idea that the Moon does not have a definite shape Table 3 depicts that the mean score increases considerably after remedial teaching. From Table 4 and Fig 2 it can be concluded that for Question Nos. 6 and 7, i.e , about the shape of the Sun and the Stars maximum number of pupils have misconception For Question No.6, 73% and for Question No.7, 68% of the B.Sc. B Ed. students have the misconception. The symbols or the diagrams used in the textbooks to represent the Sun and the Stars are thought to be their real shapes. The maximum number of correct responses are noted for Question No 9 which is a knowledge-based one. To know the effect of remedial teaching, the 't'-value was calculated. The 't'-value is

3 70 which is significant at .01 level. The high 't'-value predicts that the remedial teaching has a tremendous effect on the achievement level of the pupils.

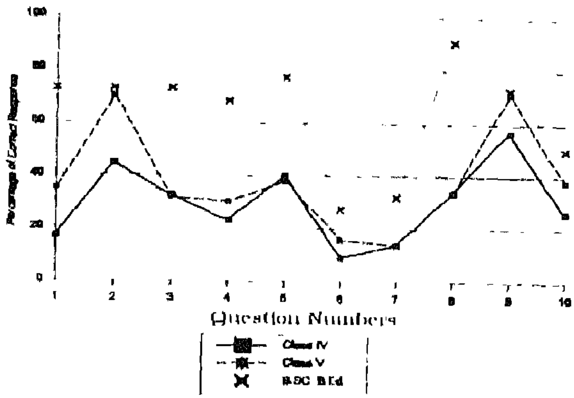


Fig. 2 Percentage of Correct Response Question-wise for Different Classes

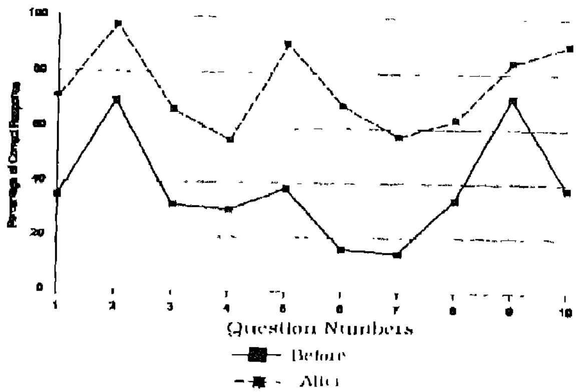


Fig. 3: Percentage of Correct Response Question-wise for Class V

Major Outcomes

- Pupils at primary stage have misconceptualisation of astronomical concepts.
- Teachers have misconceptions related to astronomy.
- By following innovative remedial teaching strategies in the intervention area, the achievement level can be enhanced.

Suggestions for School Effectiveness

The necessity of appropriate textbooks are very high The teachers have a marked tendency to rely on textbooks Hence, the textbooks should contain pictorial presentation along with tips to demonstrate specific concepts in a classroom situation. Pictorial presentations for the following may be given in the textbooks:

- The exact shape of the Earth, Sun, Moon and Stars
- The position of the people on a model of the Earth.
- Relative sizes of different astronomical objects.
- Position of clouds above the Earth's surface

For demonstration of astronomical events, models may be prepared. It is pointed out by Evans (1996) that teachers are untrained and ill prepared to meet their responsibilities In this perspective the teachers may receive proper training to demonstrate and present the facts clearly. Peterson (1993) emphasises that teachers should know their students' prior knowledge and levels of understanding in order to improve pupils' achievement. In this perspective the misconceptions of the pupils may be identified and the teacher, by knowing the pupils', misconceptions may follow innovative teaching strategies to ensure an effective teaching-learning process leading to the quality improvement of primary education.

Potential area of research

- In the present investigation the misconceptions related to astronomical concepts are considered. Similarly studies on other concepts can be carried out taking large sample.

- Designing of remedial teaching in the intervention areas to help the teachers.
- Designing of self-learning materials to encourage child centered learning.
- Cross-cultural study may be undertaken to know the astronomical concepts among the pupils.

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SECTION IV

Innovative Practices for Teacher Empowerment

The studies discussed in this section include:

- The Phambili Project — The Way Forward
- Crushed Amongst Teacher Guides and Students in Practice of Teaching: Guiding Teacher Learning
- Motivation and Classroom Practices as Indicators of School Effectiveness

12

The Phambili Project— The Way Forward

(An Inset approach to improving the quality of school experience for primary school children)

David McKellar

The study aimed at developing a learning culture among teachers and motivating them to strive for quality of experience for all children under their care. Strategies were used to promote critical thinking, cooperative learning and problem-solving skills among teachers. These included facilitators' assessment on usefulness of workbooks, students' participation, and students' understanding of content, method and facilitators' effectiveness. The responses of students and teachers suggested that the project had a considerable impact on them.

Introduction

When one inherits an education system racked by dismal physical facilities, unqualified and under-qualified teachers, overcrowded classrooms, set in a society where the culture of teaching and learning is almost non-existent, where does one begin to tackle the problem? What can individuals and independent institutions do about tackling an educational nightmare in a socio-political climate where corruption, mis-management and ineptitude are rife? The Phambili Project is an example of how individuals with a passionate belief in providing quality primary education for children may provide one way of improving the opportunities for children and their wider society

The horrors created by the apartheid policies over a forty-year period are well documented. The architects of the apartheid policy used education as a manipulative tool for social engineering and this has resulted in the complex difficulties faced by all concerned with putting right the injustices that developed. Such was the scale of manipulation by the apartheid policies that South Africa is faced with what must be a unique situation internationally. Yet one that must have significance for all developing countries grappling with the need to provide a quality education for all children, particularly those in primary schools. South Africa has a relatively small number of excellent schools that would compare favourably with the best in the world (and previously, serving white children only) The vast majority of schools, however, provide little for the children who attend them—and the challenge is to correct this imbalance.

To understand some of the problems we face, consider the number of children for whom there is no place in state schools, resulting in overcrowding in classrooms The Eastern Cape is the fourth largest province in South Africa. Based on 1997 data, primary schools offered 1,019,424 places yet there were 1,694,248 children registered in these schools (Department of Education, 1997, p.5.). Put another way, for every ten school seats available, sixteen children filed into the classroom. As most classrooms have about forty seats, we have about 64 children jammed into a classroom. Of further significance is the fact that 72.6% of children in the Eastern Cape are in primary schools.

If we consider the teacher-pupil ratio, the picture is as bleak Teachers with a primary school qualification of some sort numbered 34014, meaning that the teacher-pupil ratio was of the order of 50:1 It is acknowledged by the Department, however, that the statistics may have masked the fact that some classes reflected a ratio of 100:1 or more (Department of Education, 1997 p.5).

If we consider the actual qualifications of these teachers battling to cope with overcrowded classes, the situation is anything but satisfactory. Of the 34014 teachers listed with a primary school qualification, 17142 (50 4%) have a level of qualification that is classified as "under-qualified" and therefore these teachers are registered — in terms of the national criteria — as "unqualified". Put another way, in an average school of 900 children with a

staff of fourteen teachers, seven will be classified as "qualified" to teach the 900 children.

Rhodes University believed that one of the ways of improving the quality of education in primary schools was to provide an opportunity for teachers not only to improve their qualifications, but to focus on the issues being promoted at the national level— Outcomes Based Education — and the introduction of a new national curriculum entitled "Curriculum 2005". Building on recognition of prior learning, earlier basic teacher training courses and the considerable teaching experience of teachers interested in attending the course, a one-year full-time course was developed that would enable these under-qualified primary school teachers to meet the national criteria— and contribute towards correcting the immense problems faced by all involved in tackling the injustices extant. The course was run in 1996 and such was the success of it that, when offered in 1997, demand exceeded places. Over four hundred teachers applied.

The provincial minister of education had expressed full support for the course and publicly used it as an example of what could and should be done towards solving the problems, in education and in primary schools in particular. Politically, however, matters took another turn when — in response to widespread political problems — the ministry found itself with a new minister of education. Because of budgetary indiscipline the authorities, amongst other moves, cancelled all study leave for teachers.

It was clear that another plan was required to enable teachers to attend a comparable course. Thus was it that the Phambili Project was born.

Objectives

The objectives were simple and clear :

- A course was required that would meet the national criteria for accreditation and thus provide teachers completing the course with recognition as qualified teachers
- The course should contribute towards the culture of learning and teaching by motivating the teachers to strive for a quality of experience for all children in their care.

- The course should provide teachers with insights into the new national initiatives in terms of Outcomes Based Education and the new Curriculum 2005.
- The course should promote critical thinking, cooperative learning and problem-solving.
- Teachers should become aware of the importance of early childhood development in terms of its broader meaning rather than having a narrow focus on a particular age-group.
- Other objectives included the promotion of mathematics, science and technology, while the importance of language and recognition of cultural diversity are also key strands permeating the Phambili Project curriculum.

Methodology

As teachers would not be granted study leave, the problem of providing a course that did not take them out of their classrooms, had to be addressed At the same time, it was felt that the project should enable teachers from rural and distant parts of the province to participate. The solution was found in two ways: first, by including three selected non-government organisations (NGOs) as participants in the teaching of the diploma and, secondly, by way of the design of the course and its curriculum.

The selection of the NGOs was critical to the success of the project. After careful consideration, three NGOs who had successful track records in the delivery of early childhood education programmes or primary school support projects were selected. For the NGOs, being a part of the Phambili Project provided them with recognition and status as well as the opportunity to be contributory members of the curriculum development team. It also served to provide them with further credibility in terms of their approach to funders for financial support for this and other projects.

The selected NGOs enable the Project to be offered to teachers in distant parts of the Province which includes schools in rural areas— the latter usually neglected in terms of receiving support from central authorities based in the major centre in the province.

The Project required the NGOs to be actively involved in all aspects of curriculum development and in the dissemination of the materials developed. Meetings were planned and held in various centres where the partnership had to fulfill the following requirements.

- identify and solve problems and make decisions using critical and creative thinking
- work effectively with each other in the group as well as with the participants on the course and their school communities
- organise and manage the partnership and courses responsibly and effectively
- collect, analyse and critically evaluate information for the courses
- communicate effectively in oral and written form
- use science and technology effectively and showing responsibility towards the environment and health of others
- understand that the world is a set of related systems and that problems do not exist in isolation.

As the course was to be accredited, the curriculum and duration of the course as well as teaching time had to satisfy national criteria — as well as satisfying internal standards set by the University. Because an underlying principle of the design of the project required that the teachers not be removed from the classrooms during the course, it was planned that teaching would take place on Saturdays and during school holidays. During the lengthier summer holiday, two sessions were stipulated to provide for additional workshop and teaching time.

It was also felt that the urgency of the situation was such that we could not wait for the academic year to come round before getting underway. Why not start as soon as practicable and redefine the concept of an academic year? Fortunately, the administrative arm of the University was very supportive and the Project got underway in October 1998, rather than having to wait for February 1999 when the normal academic year begins in South Africa.

The plan called for forty contact days, each of six hours duration, thus totalling 240 hours. In addition to this, a course requirement is that the teachers have to form Study Circles consisting of between two to six participants. These Study Circles have to meet after each course meeting and collectively work on the assignments set for this purpose. A facilitator is appointed for each meeting and this is rotated so that each member is required to fulfil the functions of the facilitator at some stage. Problem-solving by the Circle is a strategic part of the course design, and the Study Circles are required to report back to their respective centres.

Development of Course Materials

The University takes responsibility for the development, printing and distribution of the teaching materials. As noted earlier, the NGOs contribute ideas and materials for consideration. Once agreement is reached on the nature of a module, the study guides are written and produced by a small group of members of the Department of Primary Education at the University working under the guidance and leadership of the Project Coordinator, Margaret Irvine.

It is interesting to note that because of the prohibitive costs of textbooks, strategies have had to be developed to enable teachers to have access to international developments in respective disciplines without having to purchase extremely costly texts. This problem is compounded by the fact that the teachers do not enjoy access to academic libraries — particularly teachers from rural and distant parts of the province. The answer has been for the curriculum development team at the University to write their own materials and module handbooks. Though costly in terms of time (and therefore salaries), an advantage emerging from this situation is that the materials produced have been adapted to local conditions and issues, resulting in the materials having considerable significance and relevance for the teachers taking part in the Project.

Common Approaches to the Teaching of Each Module

It was agreed by each of the NGOs and the University that the teaching and presentation of the modules had to follow as uniform

an approach as possible so that none of the teachers in the various centres might feel that their experience throughout the course was in any way inferior to that offered by other centres. It was also felt that a common standard should be reached, with the teachers writing the same examinations during and on completion of the course. For this reason, the Curriculum Development team produces a detailed guide for the facilitators as to how to present the materials

This strategy has been welcomed by the facilitators. It is possible that such an approach might stultify initiative, spontaneity and creativity of thinking, but the response to date has been that this has not proved to be the case. As the emphasis is on the teachers doing the learning rather than the NGO or University lectures doing the teaching (in keeping with the Outcomes Based Education philosophy), the Facilitator's guides had provided the direction and issues to be explored rather than any particular pre-conceived 'one-and-only-one correct' response

The Curriculum

The curriculum satisfies—indeed, exceeds—the national criteria governing courses for teacher training. Although the national authorities have introduced Curriculum 2005 as the new national curriculum for schools, very little support material has been made available for schools and teachers. The Phambili Project curriculum developers have had to write many original guidelines on how the new curriculum in schools should be approached. In brief, the curriculum for the Phambili Project participants adopts the following format·

Academic credit	*Topics*
Education Studies	The Teacher
	Aims for Education
	Values and Norms for Education
	The School Community and the Learners
	Human Development

	Primary Health Care
	Special Education Needs
Professional Studies	Cooperative Learning
	Problem- solving
	Organising and managing oneself
	Collecting Information
	Conflict Management
	Showing responsibility
	Communicating Effectively
	Curriculum 2005: Terminology and Primary School Phase Documents
	Primary Heath Care
Primary Curriculum Studies	Language, Literacy and Communication
	Arts and Culture
	Design and Technology
	Human and Social Sciences
	Natural Sciences
	Numeracy and Mathematics
	Life Orientation
	Economic and Management Sciences
Computer Literacy	Basic Word Processing

The teachers are also registered for Teaching Practice. As mentioned earlier, the vast majority of teachers have considerable experience of teaching or managing schools, but it is felt that the teachers should be encouraged to implement changed teaching strategies in response to the curriculum inputs completed during the Saturdays and school holidays. The University and NGO staff provide support visits to each of the schools involved in the Project. The emphasis is on offering advice and support rather than evaluation of the teachers' performance — although the latter is part of the process.

Assignments

An important part of the Project are the assignments set in response to each of the course units. The emphasis here is on pragmatic interpretation of theory, focussing on the quality of schooling offered to children in primary schools as well as the importance of teachers harnessing the value that parents and the community contribute to this experience for children.

Assessment of the Teachers' Performance

Successful completion of the course will result in a teacher not only being regraded as a "qualified" teacher, but also receiving a considerable improvement in salary The diploma, issued in the name of the University, will by recognised nationally. It follows that assessment of performance is an important part of the design of the project

The University requires that at least 50% of the total mark be arrived at by way of formal examinations conducted at the end of the course. In the case of the Phambili Project, it was agreed that assessment would follow that route: 50% for final examinations, and the other 50 per cent being an assessment of a portfolio that each teacher has to produce. The portfolio consists of assignments completed throughout the course as well as teaching materials and teaching aids that they have produced or constructed. In addition to this, each teacher has to maintain a portfolio of his or her teaching experience in terms of planning, assessment of the learning programmes and assessment of the children's progress

At the end of the course each teacher is required to produce and present a display of the portfolio which will be assessed by the course facilitators.

Assessment of the Effectiveness of the Phambili Project

Several strategies are being used to assess the effectiveness of the Phambili Project.

The facilitators assess each session using a simple instrument that examines the following key points:

- The facilitator's Guide
- The facilitator's preparedness to facilitate the session
- Usefulness of the workbook
- Student participation
- Student understanding of content and method
- The facilitator's effectiveness as a facilitator of learning

The facilitator is also invited to comment in writing on any other issue arising from the session

The students are invited to assess the course modules as well as responding to a more formal assessment of the effectiveness of the Phambili Project midway through the Project and again at the conclusion of the Project. Formal evaluation of the Project is being conducted by the Academic Development Centre of Rhodes University, thus providing an independent review of the progress made. They have produced a comprehensive mid-point evaluation and will follow this up by with a final evaluation at the end of the Project.

The mid-point evaluation has provided interesting comments from the participants as well as very positive feedback on the success of the project. Of course there is criticism of aspects of the project but of particular interest is the fact that the evaluation shows that teachers in the various centres show agreement on issues. It means that the groups are providing a common response, rather than different responses This has been reassuring as it was hoped that the various centres would experience a common standard.

Implications of Findings for School Effectiveness

The teachers involved in the Project appear to consider the course as having considerable impact on their views about teaching as well as on teaching strategies in the classroom. This can be illustrated by the following comments:

- This is more than just studying.
- Our thinking is being taxed all the time. We find ourselves discussing issues we would never dare discuss at school.

- Due to negative comments from my colleagues about (Outcomes Based Education), I withdrew from implementing (it). But now, with this Diploma, I am ready for a good start. I'm ready especially for the obstacles in my way I want to yell to the world and say I'm free at last.

  We always thought we were too old to study, but now we are mature enough for this kind of learning. We find it exciting to drive the process

  It is not easy to say goodbye to old habits. They die hard. Forward with our Diploma, backwards never We are teachers born again

Where to Now?

We have learned how valuable it is for a University and competent non-government organisations to get together in tackling problems that appear insurmountable when tackled alone. We are happy to share our findings with you. We would welcome forming partnerships with anyone who could use our approach. In the final analysis, perhaps this teacher in the Phambili Project summed up best why we think the Phambili Project is working and way we could work with any of you if you are faced with a similar situation:

> *We thought it was the task of the tutors to drive the process but instead they are the passengers and we are the drivers of the course. How nice.* (Comments from Nkayi D, 1998.)

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13

Crushed Amongst Teacher Guides and Students in Practice of Teaching: Guiding Teacher Learning

Sunethra Karunaratne M.A.A.S. Dias

The study aimed at investigating specific guidance required by Grade III teachers for improving the quality of teaching at primary stage in Sri Lanka. The study consisted of three phases, namely, observation, collaboration/conversation and monitoring. The findings of the study revealed that due to interventions provided, the teachers were able to shift their teaching from teacher-centered to student-centered strategies.

Introduction

Among all the professions in the world, teaching is a very familiar profession to almost everybody. In Sri Lanka there are about 1,79,590 teachers and out of them about 71,836 teach at the primary level. Of the 10,300 schools in the island, 2,809 are primary schools, and in most of the other schools (6,944) there is a primary section In Sri Lanka, parents plan to send their child to a good school even before a baby is born. They try to buy land and build houses close to a good school so that they will be able to send the child to a good school. Some leave their own homes and rent a house close to a good school. The electricity and water bills are produced as proof of residence. According to them "good schools" are the schools which produce "good results" at the scholarship examination conducted at the

end of the primary level, G.C E. O/L and A/L (General Certificate of Education, Ordinary Level and Advanced Level)

Considering the research on education in the 1960s, most of the studies fall into the category of "effective schools" with the objective of improving schools. A large number of samples was used in research studies and data analysis was mainly done using percentages, z-test, t-test, correlation coefficient and regression coefficient (Quantitative research). The Findings of such research did not lead to much of an improvement in the schools. The focus of research was changed in the 1970s to "effective teachers". There too the aim was to find statistical relationships with different variables, using ANOVA (analysis of variance). The research emphasis was on "What teachers should know?" Neither the research on "effective schools" nor "effective teachers" had a positive impact in improving schools. As Gallagher (1992) says, these research studies were based on the assumption that knowledge is viewed as a commodity to be transmitted to students whose responsibility is to learn it in a way that is faithful (BEHAVIOURIST - POSITIVIST TRADITION). Teaching was equated with transmitting information to student and learning was equated to acquiring information quite frequently by memorisation (i.e., receiving and storing knowledge).

TEACHER —**Transmits scientific knowledge to**→ STUDENTS

Assessment of learning was summative to identify the students who have been successful in acquiring the information Kennedy (1991) formulates an equation to show the relationship of achievement gained by students as follows:

Achievement gain = earlier achievement + family support + Amount of teacher's education + recency of teacher's education

This dominant paradigm of teaching and research changed in the next two decades.

WHAT TEACHERS SHOULD KNOW	DOMINANT PARADIGM	BEHAVIOURIST-POSITIVES TRADITION
↓	↓	↓
WHAT TEACHERS NEED TO KNOW	NEW PARADIGM	CONSTRUCTIVIST TRADITION

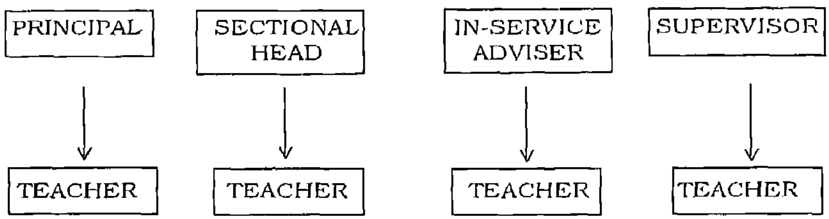
Research in the 80s was mainly on issues of equity and equality in education, and towards the 90s there was a change in research tradition which relied more on words than on numbers (Qualitative research.) Thick desciiptions of happenings in classroom teaching were used as data in analyses. Research emphasis was on: What teachers need to know? Teaching in the classroom setting was also undergoing change, and knowledge was viewed as something that was constructed by students. According to this Constructivist Tradition, teachers help students acquire scientific information, and assess them to find out whether they have acquired it or not, i.e., Making Sense of what they are learning

← $\boxed{\text{TEACHER}} \xrightarrow{\text{helps}} \boxed{\text{STUDENTS}} \xrightarrow[\text{construct}]{\text{to}} \boxed{\text{knowledge}}$

In this tradition students need to integrate the new information with what they already know, i e., MAKING SENSE and MAKING CONNECTIONS. Students need to learn how to apply their new knowledge beyond the classroom and connect their knowledge with the world outside the school. To guide students in this direction teachers are required to spend a lot of time in planning and preparation. Kennedy (1991) has revised the achievement gain equation to suit the CONSTRUCTIVIST tradition as follows.

Achievement gain = $\boxed{\text{earlier achievement}}$ + $\boxed{\text{family support}}$ + $\boxed{\text{teacher's desire to improve}}$ + $\boxed{\text{quality of teacher's education}}$ + $\boxed{\text{school climate}}$

In Sri Lanka, relationships of teachers with other personnel are varied. For example, teachers have relationships with the principal as the head of the school, they also need to build relationships with sectional heads of the school, and also with the in-service-advisers and other officers from zonal, district and provincial offices, Ministry of Education and Higher Education (MOEHE) and National Institute of Education (NIE). In all these relationships teachers play a subordinate role where the other officers play a superior role. This kind of superior-subordinate relationship, in a hierarchical setting, does not invite teachers to discuss their problems with the superiors. It obstructs the quality improvement in teaching.



Superior-Subordinate Relationship

Researchers who go to the classroom to study what is happening in the classroom do not have a supervisory role to play. They observe what is happening and interview students and teachers to understand what has happened. Therefore, the relationship between the teacher and the researcher is different from the above superior-subordinate relationship. It is a collegial relationship.

Collegial Relationship

As with Dewey (1993), to gain successful results of this relationship both the researcher and the teacher should possess

intellectual attitudes, such as open-mindedness, whole-heartedness and sense of responsibility. Feiman-Nemset et al. (1994) propose a professional activity called "Guided Practice", which incorporates Dewey's ideas and also covers terms such as mentoring, coaching, and field instruction.

Objectives

The study intended to identify specific guidance required by teachers to improve their quality of instruction by reflecting their own teaching.

The guiding research question was. How does the guided practice help improve teaching? To answer this question the following subsidiary research questions were also asked:

- What did teachers learn from the guides?
- What did researchers discover as the needs of teachers during guided practice?
- What did researchers find out about teachers in co-planning and co-teaching?
- How could the existing practice of teaching be changed to improve the quality of instruction?
- The guided practice framework (Fig. 1) was used in this study.

Research Methodology

A school close to the work-place of the researchers (National Institute of Education, NIE) was selected for convenience. In this particular school there were five classes of the third grade. Five teachers who had obtained teacher training certificate from Teachers' Colleges were in-charge of these classes. They all had more than twenty years of experience in teaching. After negotiating with the principal and the teachers, a two-day workshop was conducted during a weekend at the NIE to orient the research team and to inform the principal and the teachers about the objective of the study. In order to understand what teachers needed to know it was necessary to observe how teachers plan their lessons. Therefore, on the second day of the

workshop, teachers were asked to plan lessons for two weeks, while they were observed by the researchers.

The entire study consisted of three phases of two-weeks duration and a two-day workshop in between.

Phase I-Observation

During this phase five researchers went to five classrooms and took down extensive field notes of what happened in the classroom. They observed how the teachers implemented their lesson plans in the classrooms. The observations helped the researchers to identify weaknesses of teachers and the specific areas to be considered in lesson planning and teaching in the second phase.

Phase II-Collaboration and Conversation

Researchers and teachers did lesson planning and teaching together at the workshop after the first phase and during the second phase. At the end of each day there were discussions on the day's happenings in the classrooms and planning for the next day's lessons. Special attention was given to teachers' concerns rather than the researchers' (guides') Researchers were careful not to mention teachers' weaknesses but tried to make them understand their mistakes by finding opportunities to pinpoint problems of teachers indirectly, posing guiding questions and inviting their ideas for discussion Through these discussions teachers gradually started reflecting on their teaching. At the end of this phase, a workshop was conducted to exchange experiences with each other, where teachers wrote down their reflections on the intervention of researchers

Phase III-Monitoring

This was another phase of observation where researchers paid attention to understand how teachers implemented what they had learnt from researchers.

Findings

The most visible change in all the five teachers was in their lesson planning. This change had influenced so many other changes in

the teachers to improve their teaching (Fig 2). On the second day of the first workshop when teachers were asked to develop lesson plans for two weeks, they completed lesson plans for the whole term. All the teachers taught language, mathematics and environmental studies to third graders Hence, they liked to do lesson planning together. While planning they had their teachers' guides and syllabuses in front of them and went through them page by page Most of the time they copied what was in the teacher guide in to their plans After talking a while they ignored the places where there were suggestions for teachers to design activities by considering the school and classroom context.

At the end of the first phase researchers found that there were some common patterns in their instruction. They started the day by offering flowers to Lord Buddha and observing religious activities. Instruction was started by writing the date on the upper left corner of the chalkboard. Most of the time they began the lesson by saying "Today we are going to learn about . " and wrote the topic on the board. Sometimes teachers asked questions from students to start the lesson, but student responses were not taken into consideration in building up concepts, while teaching they had the teacher guide in front of them and looked at it time to time. They did not open the lessons plans that they had written. At the end of the lesson the teacher wrote a summary in nice round letters including punctuation. The students' task was to copy what the teacher wrote. The teachers marked these notes and stars were awarded to students who copied nicely. According to the teachers, the notes given by them were appreciated by parents as well as the principal and other administrators.

It was a difficult task for the researchers to make teachers identify and understand their weaknesses. In the intellectual work during the second phase, the researchers had to confront dilemmas, pose guiding questions, provide clues to get teachers' ideas. Planning lessons as a collaborative activity of the researchers and the teachers provided opportunities to pinpoint shortcomings of the teachers as examples related to a topic under discussion. There were prolonged discussions to let teachers realise their mistakes and to suggest overcoming strategies. For example, some teachers wrote even the objective given in the teachers' guide on the board. Although there were discussions focussed

to move away from this habit, it took time for teachers to note the irrelevance. Towards the end of the co-planning exercise, teachers were able to write descriptive lesson plans as steps, including questions to be asked and anticipated answers. This improvement made by the teachers in lesson planning influenced them to make some other changes which will be exemplified in the following vignettes of teachers.

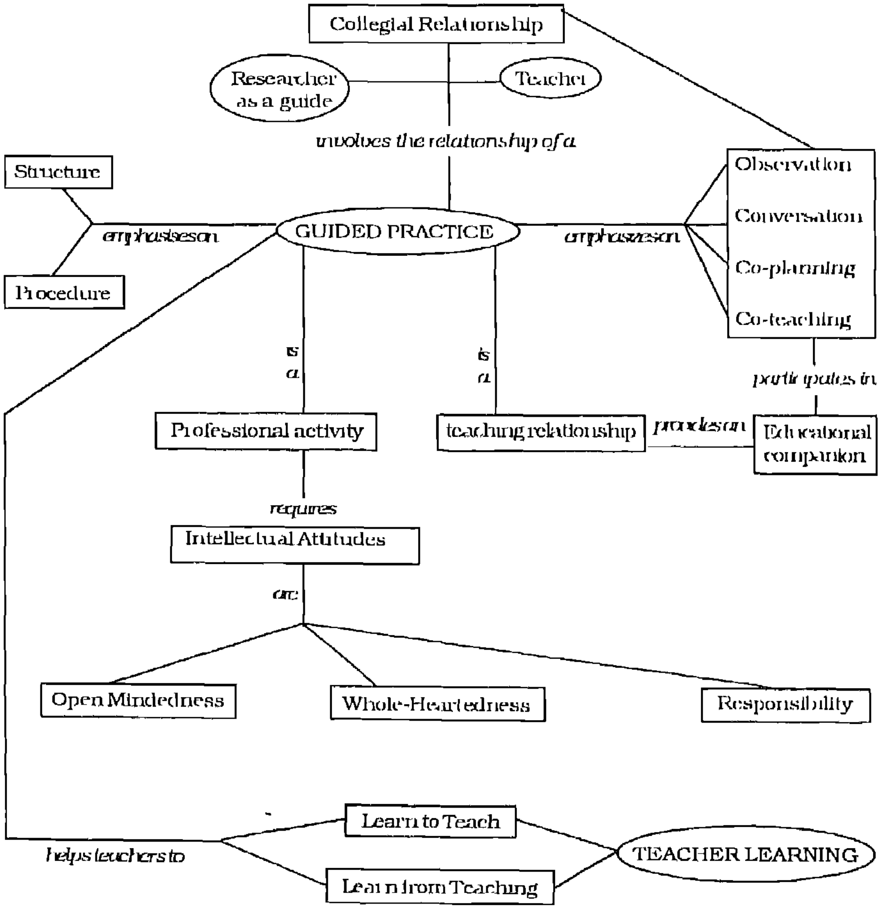


Fig. 1: Guided Practice Framework

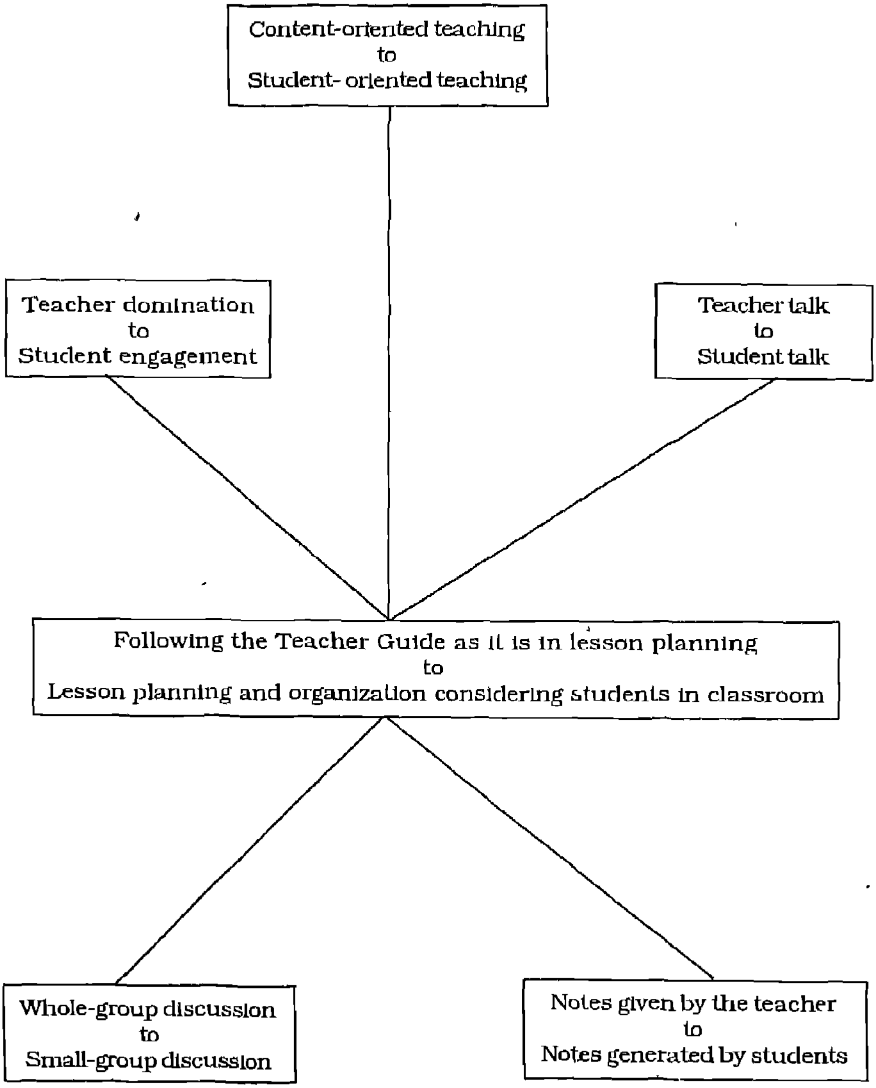


Fig. 2. Summary of findings of the study

Mrs Silva

Mrs Silva was a teacher who showed a remarkable change in her lesson planning. She was the language coordinator for the third Class. She was observed to be writing very brief lesson plans. Sometimes only a few words comprised her lesson plan The objectives of the lesson were often missing, instead she put down the number of the relevant lesson objective in the teachers' guide It appeared as if she was fulfilling the official requirement of writing lesson notes. One of her lesson plans and the relevant extract from the teacher's guide are as follows·

Extract from the Teacher's guide

4 0 Pronunciation

Objectives	Teacher tasks	Student tasks	Reinforcement
4 2 Improvement of correct pronunciation skills	4.2.2 Preparation of a list of words suitable to improve pronunciation. Present the list to students and make them pronounce correctly	Read the words loudly with correct pronunciation	Encourage to read the lists of words prepared

Mrs Silva's Lesson Plan

Objective 4.2.2

Teacher task- Instructing to prepare a list of words suitable for improving pronunciation.

Student task- Read the words loudly with correct pronunciation

Mrs Silva implemented teacher-dominated lessons without taking into account student preconceptions and abilities. Hence, the lessons appeared to be dull and stereotyped. Although the classroom was arranged into groups, no group activities were observed during the language lessons. During the co-planning sessions, Mr Silva's contribution was minimal at the beginning.

When others were presenting ideas she kept quiet. But as she was the language coordinator the other teachers wanted to get more information from her Gradually she started talking and towards the end of the phase she expressed her ideas very freely. It could have been due to the self-respect she gained as a result of the feeling of being needed with her services as the coordinator.

A significant change was observed in Mrs Silva's lesson planning and teaching during the monitoring phase Not only she wrote detailed lesson plans, but also she tried to integrate the subject-matter on a thematic approach. One such lesson was where she had to teach a type of traditional Sinhalese folk songs This particular lesson was very creative and had many favourable characteristics, where she taught a type of Sinhalese folk songs sung by "chena" cultivators who kept awake at night to protect "chena" (cultivated ground) from wild animals. Her lesson plan was as follows:

Lesson Plan

1 1.1 Listening and singing of Folk Songs

Opening of the Lesson

We learned about the farmer who provides us with rice, vegetables and fruits in a previous lesson. We also know that farmers produce many other types of crops such as cereals. These crops should be planted not in paddy fields but in chenas. Chenas are prepared by cutting down trees in certain areas of the forests and building fences surrounding the area In order to protect the crops from wild animals chena cultivators have to stay in the chena at night He builds a small hut on top of a tree in the chena and is there during the whole night without falling asleep. There he used to sing certain verses to overcome his loneliness, sleep and to drive away the animals. We will learn such a verse now

Student activity

Dramatisation of a chena at night.

The verse 1 (Verses not included, they were in Sinhala-language of Singhalese)

The verse 2

Reinforcements

1. Encourage students to come in front of the class to sing the verses.
2. Ask the students to listen to verses with appreciation.
3. Ask to recite other verses if they know.
4. Ask the students to learn more verses from parents and grandparents.

For this lesson she had asked the students to prepare the classroom dismantling the group structure. Desks and chairs were moved to a side and in one corner a chair was kept on top of a desk to denote the hut of chena cultivator. One student sang the folk songs while the other students mimed to play the roles of various wild animals coming to the chena.

The above vignette shows the changes observed in Mrs Silva from a brief lesson note to a descriptive one, and teacher domination to student participation.

Mrs Zoysa

Mrs Zoysa was a young and enthusiastic learner compared to other teachers. She was found to be following her senior colleagues in lesson planning, when we met her at the first phase The researcher who observed her teaching noted that she had several misconceptions regarding some mathematical concepts Being a keen learner she unlearned them very quickly. She implemented many group activities; sometimes different innovative activities were also given during the same lesson. During peer observations she tried to help her colleagues in implementing group activities She expresses about her experience at a discussion as:

> *I feel we should do away with following a common lesson note without incorporating one's own creative ideas. Students should not be restricted and pressurised with teacher ideas. They should be allowed to express their ideas and we must help them in organising those. I felt team teaching was a very good strategy even with the limited experience I gained. A teacher would feel much comfortable and less trained if team teaching could be carried out*

Mrs Zoysa appreciated the friendly relationship that developed between the researchers and teachers, where they were able to talk freely without fear of being evaluated. It was an important factor that facilitates teacher learning.

Mr Somadasa

Mr Somadsa, although he taught the third Class during the recent past, had experience in teaching in all classes during his teaching career. He had 35 years of experience and had taught in a number of schools. He appeared to be a rather strict master. He was the sectional head for Classes I-III

The main assertion formed during the first phase by the researcher who worked with him was that his method of teaching involved predominant teacher talk and teacher domination. His sentences were long and his vocabulary consisted of high-sounding words. He would go into too much detail along one aspect. Although he asked questions he would answer them himself without giving an opportunity to his students. During his lessons most students were passive listeners, while certain others were engaged in activities such as talking, playing desk games using pencils, pen-covers and pencil-boxes. Mr Somadsa was found to be exhausted after his teaching at the end of the day. His ideas about his teaching were:

> *I have been teaching all the classes in my teaching career Mostly I have taught the higher classes. I am used to talking in this manner. If I use big words my students will also start using them and thereby would improve their language.*

During the second phase the researcher worked with the teacher to reduce his control over the classroom discourse in order to allow for increased pupil participation to let him realise his shortcomings on his own. The researcher had to do a considerable amount of modelling in order to achieve a favourable result. One such lesson involved a role-play of an episode in a public bus dramatised with the objective of enhancing active listening and values of students. Another factor which contributed to his change was peer observation of teaching. He too observed Mrs Silva's lesson on "folk songs".

Mr Somadasa enjoyed the student activities during the second phase, and as a result he expressed himself in the last phase realising the shortcomings:

> *Children's desire to be active could be used in their learning.It is best to consider this as a principle and organise the teaching to incorporate student activities.*

Mr Somadsa gradually incorporated student activities into his lesson plans in contrast to the "teacher talk" approach adopted in the phase–I where the subject content was delivered predominantly by the lecture method. He encouraged the students to come up with ideas facilitating "student talk". Use of simple language and adoption of appropriate questioning techniques enabled the students participate better. Both the students and the teacher appreciated the change.

Mrs Ratnayake

Mrs Ratnayake possessed the habit of writing lesson notes daily and tried to involve students in activities specified in the teacher's guide. She had the inclination of extending her hand to help the slow learners. When examining her lesson notes it was found that it was almost a carbon copy of the teacher's guide.She merely copied the relevant portion of the teacher's guide daily. Even when implementing the lesson she would peep into the teacher's guide for reference. The teaching aids used for the activities were sometimes technically incorrect. One such critical instance was with the usage of the abacus. She had given instructions to make an abacus at home on the previous class. All what students brought were incorrectly made. The rods which should have had the height just enough to incorporate only nine disks/balls were far too long. The mere concept of 'place value' could not be constructed such an abacus. The researcher modelled the activity with a proper abacus that she borrowed from the NIE. Mrs Ratnayake realised that she should look into the accuracy of the teaching aids intended to be used in activities.

When the activities were over she would also dictate/write a note on the board for the students to copy. Such notes included advanced glossary terms, like standardised units The teacher's

guide includes such terms for teacher's reference, and not to be introduced in classroom instruction After going through the co-planning and implementation she realised that although she did write lesson notes before, she never did it successfully and she found teaching as a monotonous activity. She reflected her improvement as

> *Yearly we implemented the syllabus in the same old manner. We restricted ourselves to the instructions given in the teacher's guide. Although we planned our lessons we never did it properly. It is much better to write lesson plans in a step-by-step order. Then I found easy to implement them. By planning lessons without adhering strictly to teacher's guide allows us to include novel ideas. Then teaching also becoming interesting for both the teachers and students. I noticed my students were cheerful then. They also enjoyed writing lesson notes on their own with the observations and experiences made during the activities*

Mrs Ratnayke was keen on her professional development and discussed with the researcher about some of the difficulties she had in some other units

Mrs Yapa

Mrs Yapa was a teacher who wrote lesson plans and marked students' books daily. She had adopted a method to keep track of submitting notes. She considered these things as essentials of teaching, to be a good teacher. In the lesson planning exercise at the very beginning she played a dominant role in the discussion by presenting her ideas and experiences, which might have hindered suggestions of the others. In her instruction she had some routine steps. She asked the students to clap once, then twice, and then to a rhythm. According to her this was to break the monotonous behaviour of students after one lesson. She had the habit of writing the topic of the lesson at the beginning. While teaching there were instances where she asked questions from students, but she herself answered to most of the questions. Even the chorus answers given by the students were not incorporated into a discourse. Although the classroom arrangement had six groups, she never utilised that structure in her instruction

Guided questions asked by the researchers and the ideas presented by the others made Mrs Yapa to play a participatory role towards the end of the second phase. The following excerpt provides evidence of her change to involve students in the discourse.

Mrs Yapa started the class(1996.05.11) by asking the students about what she had asked on the previous day.

> T· Yesterday we talked about the things we did in the first grade How many of you have brought your workbooks and what you wore when you were in the first grade?

Students were impatient to show what they had brought Some even made comments on their friends, garments. Mrs. Yapa asked the students to display the clothes they had brought and to compare those with what they were wearing in the third grade. She whispered to me, "Let them do it on their own " She named a student in each group to report what the group thought about. (This day I noticed the change in the classroom arrangement Instead of the six groups she had, there were nine groups so that each group had five students. When I asked her about it she replied, "Yesterday when we were discussing I realised a group of five to six encourages more students interaction." After about three minutes, she started asking responses from students·

> Deepika: Teacher, they look very small.
>
> Renuka: Size is small
>
> Priyantha · Look like dolls' clothes.

Mrs Yapa noticed that students' answers were based only on the size of the clothes they brought, and she wanted to get a comparative reponse from students

> T· I asked you to see what you had put on when you were in the First grade, and to find a difference with what you are wearing now. I want you to discuss and report.

Her question helped the students to think aloud to compare the clothes, considering their growth.

This lesson was on physical and mental development of children.

Preethi: Smaller than what we wear now

Senaka. Those are small for us to wear now

Pubudu: Now we are big Our clothes are also bigger than those.

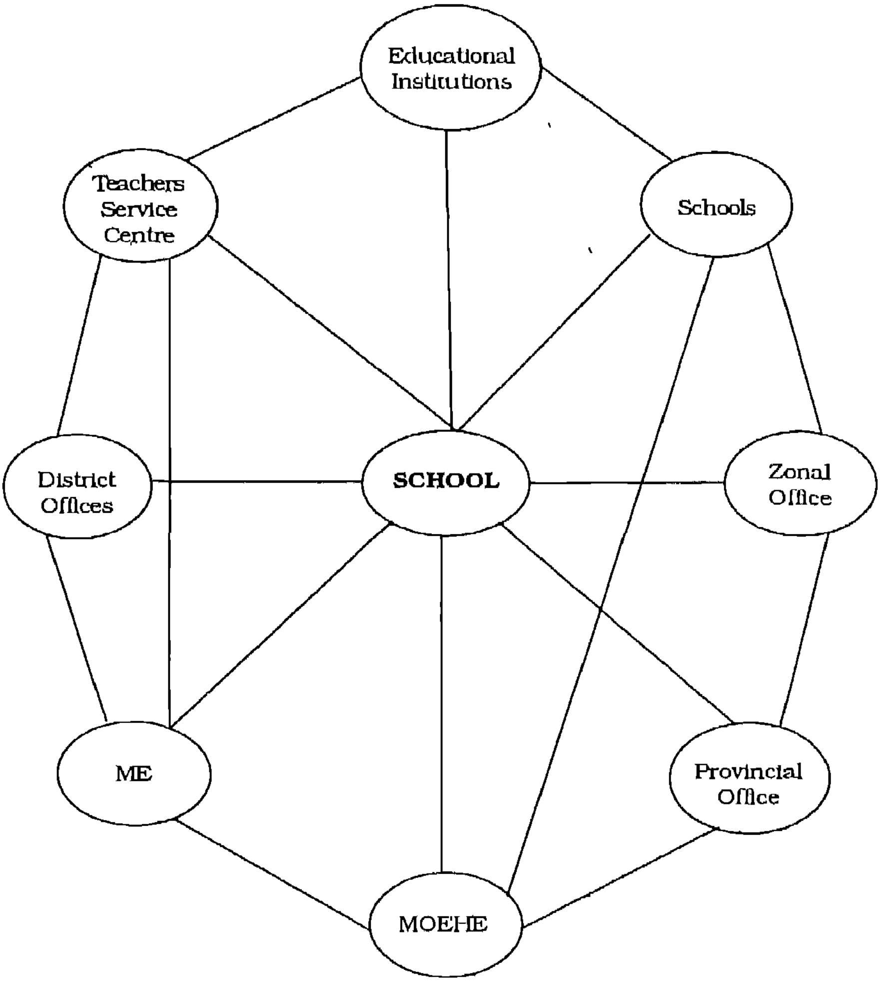
I noticed that the teacher was happy with the answer and continued a discourse with the students by asking them to compare what they had written in the first grade with the third grade. While this activity was going on she asked people to comment on what the others were saying. At the end of the discussion she was able to get from students that they were grown now physically, and at the same time there was a mental development that enabled them to work on harder mathematical problems than in the first grade.

The above vignette shows how Mrs. Yapa changed from a teacher-oriented teaching approach to involve students in doing work to construct knowledge. Teachers started using parents as a resource in their classrooms. They were happy with the way that researchers listened to them, and appreciated the way researchers helped them in correcting their mistakes in a friendly manner without directly stating the mistakes. The teachers said that they learnt so many things for their professional development from the researchers. They valued the guidance given them to learn to teach and learn from their own teaching.

Implications

As mentioned at the beginning of this paper our intervention as guides in the classrooms was to build up collegial relationship with the teachers. Through this relationship we wanted to understand what teachers needed to learn to teach. We propose the following suggestions to be considered in the professional development of teachers.

1. Although there are so many pressures exerted on teachers, teachers are willing to accept challenges and are ready to make a change. They are trainable with proper guidance. They need ongoing guidance for their professional development.



WORLD VIEW

Fig. 3. Possible Networking for Teachers

2. In guiding teachers, guides should possess competencies to identify weaknesses of teachers and to help them in providing remedies. If not, monitoring and supervision will not be successful. (Principals, in-service advisers and other officers who visit teachers' classrooms should develop the required competencies through training and reading.)

3. School culture should be conducive to facilitate exchange of ideas among teachers and peer observation in teaching. It will be helpful in developing high self-esteem to handle problematic situations Teachers should be guided to develop the habit of mind"to look for new things".

4. Exchange of ideas among teachers should be extended to the zonal, district and provincial levels (Fig. 3) Establishing teacher resource centres will help in this type of conversation. Teachers should be provided with more opportunities to discuss their problems with colleagues as well as with superiors

5. Teacher training programmes in the teacher colleges and colleges of education should have a component of research methodology in their curriculum to provide opportunity for trainees to undertake short-term research and action research to improve their own teaching by reflecting the practice.

In the existing system there are in-service advisers and other officers to monitor teaching. The approach of visiting the classrooms with a superior-subordinate relationship, needs to be changed to welcome teachers' questions and problems. Retraining officers with a new approach would not involve incurring of any additional cost to the state to bring about the changes that emerged out of this study.

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14

Motivation and Classroom Practices as Indicators of School Effectiveness

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P.R. Lalitha

The authors aimed at studying the relationship between primary teachers' motivation and their classroom practices The study also examined the influence of certain demographic factors like gender, educational qualification, teaching experience, type of school and location of school on teachers' motivation and classroom practices. The study was conducted on a sample of 224 teachers from 68 primary schools in one DPEP and one non-DPEP district of Andhra Pradesh. The study revealed that teacher motivation had a significant role in improving the classroom practices.

Introduction

In spite of adequate infrastructure available to the students and efficient administration, the school effectiveness is determined by the teacher. Of all the different indicators which influence the effectiveness of school, motivation and classroom practices of teachers are undoubtedly the most significant Therefore, there is a need to have a band of teachers with best possible professional preparation to make a school more effective.

The basic question that arises is: Are all teachers performing their part to the satisfaction and aspiration of people ? Teacher

inability to make their pupils accomplish MLLs, in spite of many interventions through DPEP is an indication that their performance is much below the expectations. The criticism against the performance of teachers is that they teach mechanically and the classroom practices involved do not kindle intellectual curiosity. The POA(1986) observes that though there are a class of teachers, who inspire their pupils, there are some. who ignore their obligations and are not conducting themselves in a manner befitting to the profession. One therefore needs to ponder and examine why there is such a variation in teacher performance. Of all the determinants which could be considered in this direction is, the 'teachers' motivation, for, performance in any field of work is a function of efficiency and motivation to work With teachers being selected mostly on the basis of their qualification and professional training, the answer should be in their motivation to work.

With emphasis being laid on human resource development and management, interest in the area of motivation to work has escalated dramatically in the recent years What is required is· (i) to attract people to join the teaching profession and remain it, (ii) teachers perform the role they are expected to in the most dependable manner, and (iii) teachers should go beyond this dependable role performance and engage in some form of creative, spontaneous and innovative behaviour at work One should hence come to grips with the motivational problem of both the decision to participate and the decision to produce at work The classroom practices adopted depend on the teacher One can, in fact, observe that individual differences among the teachers lead to variation in classroom practices. This is again related to the inner urge in the teacher to perform well and adopt innovative practices, which in turn has a bearing on teachers, motivation, since education, in general, and teaching in particular, constitute no less an important area where motivation should be given low priority. This study is directed toward teachers' motivation and classroom practices

Objectives

The objectives of the study are:

- to find out the relationship between primary teachers' motivation and their classroom practices.

- to find out the influence of gender, educational qualification, teaching experience, type of school and location of school on primary teachers' motivation and classroom practices.
- to find out the difference between primary teachers belonging to DPEP and non-DPEP districts in respect of their motivation and classroom practices.

Methodology

Sample

The sample in the present study constitutes primary school teachers belonging to DPEP and non-DPEP districts. Two districts in Andhra Pradesh have been selected for the study, namely, Vizianagaram and West Godavari districts. Vizianagaram is a Phase-I DPEP district and West Godavari is a non-DPEP district. The present sample consists of 224 primary teachers drawn from 68 primary schools of both the districts.

Tools

In this study the following tools are used:

1. Teacher Motivation Scale
2. Classroom Practices Scale
3. Personal Information Schedule.

1. Teacher Motivation Scale

This is a five-point rating scale consisting of 57 items pertaining to following ten dimensions:

(a) Classroom Teaching (CT)
(b) School Administration (SA)
(c) Professional Pleasure (PP)
(d) Climatic Factors (CF)
(e) Interpersonal Relations (IR)
(f) Student Behaviour (SB)
(g) Societal (Scl)

(h) Working Conditions (WC)
(i) Professional Development (PD)
(j) Personal (Pr1).

2. Classroom Practices Scale

This is a five-point rating scale consisting of 54 items pertaining to following ten dimensions:

(a) Child Centred Practices (CCP)
(b) Activity-Based Teaching (ABT)
(c) Use of Operation Blackboard Kit (OBK)
(d) Use of Support Material (SM)
(e) Evaluation Strategies(ES)
(f) Remedial Measures(RM)
(g) Multigrade Teaching(MT)
(h) Use of Local Environment (LE)
(i) Display Techniques(DT)
(j) AV Aids Utility (AVA).

3. Personal Information Schedule

In order to know the demographic information of teachers like gender, educational qualification, experience, location and type of school, a personnel information schedule was prepared

The educational qualifications of primary teachers are divided into the following categories:

1. Non-graduate
2. Graduate/Postgraduate
3. Non-graduate with TTC
4. Graduate/Postgraduate with TTC
5. Graduate/Postgraduate with B.Ed.

The teaching experience of primary teachers is divided into the following categories:

1. < 2 years
2. 2-5 years

3. 6-10 years
4. 11-15 years
5. 16-20 years
6. >20 years.

The following types of schools are taken into consideration in this study

1. Government
2. Private Aided
3. Private Unaided.

Procedure

This study has been conducted in three phases.

Phase I: Preliminary work and preparation of tools

Phase II: Collection of data

Phase III: Analysis of data and report writing.

Findings (Results and Discussion)

A. Results

TABLE 1

Significance of r' between Teacher motivation and Classroom practices

Variables	N	df	r	P
Teacher	224	222	0.63	0.01
Motivation				
Classroom				
Practices				

The value of 'r' is significant. This shows that teacher motivation has a high positive relationship with classroom practices.

It is observed from Table 2 that most of the dimensions of teacher motivation are significantly related to the dimensions of classroom practices. The classroom-teaching dimension of teacher motivation is found to have no significant relationship with all the dimensions of classroom practices except the use of audio-

visual aids. Similarly, use of Operation Blackboard kit has no significant relationship with all the dimension of teacher motivation.

TABLE2

Intercorrelation between Dimensions of Teacher Motivation and Classroom Practices

Dimensions of Classroom Practices/ Teacher Motivation	*CCP*	*ABT*	*OBK*	*SM*	*ES*	*RM*	*MT*	*LE*	*DT*	*AVA*
CT	0.08	0.02	0.04	0.08	0.10	0.12	0.08	0.15	0.12	0.18*
SA	0.29**	0.27**	0.04	0.30**	0.27**	0.33**	0.24**	0.28**	0.30**	0.18*
PP	0.43**	0.39**	0.09	0.46**	0.51**	0.51**	0.42**	0.50**	0.53**	0.12
CF	0.47**	0.40**	0.03	0.40**	0.48**	0.51**	0.47**	0.56**	0.59**	0.29**
IR	0.42**	0.35**	-0.05	0.37**	0.37**	0.39**	0.34**	0.40**	0.45**	0.23**
SB	0.40**	0.40**	0.08	0.40**	0.42**	0.43**	0.43**	0.46**	0.50**	0.29**
Scl	0.39**	0.36**	0.11	0.35**	0.41**	0.39**	0.32**	0.40**	0.45**	0.27**
WC	0.40**	0.38**	0.01	0.44**	0.43**	0.37**	0.32**	0.36**	0.39**	0.30**
PD	0.64**	0.59**	0.14	0.54**	0.58**	0.55**	0.52**	0.48**	0.48**	0.20*
Pisl	0.60**	0.59**	0.08	0.62**	0.64**	0.62**	0.61**	0.56**	0.57**	0.21*

* Significant at 0.05
** Significant at 0.01

TABLE 3

Significance of 't' between Male and Female Teachers in Respect of Teacher Motivation and Classroom Practices

Variable	Category	AM	SD	N	df	't'
Teacher	Male	201.50	26.74	103	222	0.59
Motivation	Female	199.39	27.00	121		
Classroom	Male	206.86	50.42	103	222	2.28*
Practices	Female	191.75	48.48	121		

*Significant

The value of ' 't' is found to be significant between male and female teachers in respect of their classroom practices, whereas it is not significant in respect of motivation. Male teachers are found to be more effective in their classroom practices when compared to their female counterparts.

TABLE 4

Significance of 'F' for Qualification in Respect of Teacher Motivation and Classroom Practices

Variable	Source	df	Sum of Sqr	Mean Sqr.	F-ratio	F prob.
	Between Groups	4	25264.59	6316.15	10 22	0 00
Teacher Motivation	Within Groups	219	135382.84	618.19		
	Total	223	160647 43			
	Between Groups	4	69488 96	17372.84	7.85	0.00
Classroom Practices	Within Groups	219	484583 99	2212.71		
	Total	223	554072.96			

The value of 'F' is found to be significant Hence it may be inferred that there is a significant difference between the group of teachers' educational qualifications in respect of their motivation and classroom practices.

TABLE 5

Significance of 'F' for teaching Experience in Respect of Teacher Motivation and Classroom Practices

Variable	Source	df	Sum of Sqr	Mean Sqr.	F-ratio	F prob.
	Between Groups	5	6374.45	1274.89	1.79	0.12
Teacher Motivation	Within Groups	217	154253 91	710 85		
	Total	222	160628.36			
	Between Groups	5	30341.61	6068 32	2.52	0.031
Classroom Practices	Within Groups	217	523603.11	2412 92		
	Total	222	553944.72			

The value of 'F' is not significant. Hence it may be inferred that there is no significant difference between the group of teachers' teaching experience in respect of motivation and classroom practices.

TABLE 6

Significance of 'F' for Type of School in Respect of Teacher Motivation and Classroom Practices

Variable	Source	df	Sum of Sqr	Mean Sqr.	F-ratio	F prob.
Teacher Motivation	Between Groups	2	40 72	20 36	0.89	0 412
	Within Groups	221	5060.02	22.90		
	Total	223	5100 75			
Classroom Practices	Between Groups	2	5325.30	2662 65	1.07	0 344
	Within Groups	221	548147.66	2483.02		
	Total	223	554072 96			

The value of 'F' is not significant. This implies that there is no significant difference between groups of primary teachers belonging to different types of schools in respect of their motivation and classroom practices.

TABLE 7

Significance of 't' between urban and rural districts in respect of teacher motivation and classroom practices

Variable	Category	AM	SD	N	df	't'
Teacher Motivation	Urban	196.34	37.27	56	222	1 02
	Rural	201.70	22 30	168		
Classroom Practices	Urban	191,20	63.25	56	222	1.10
	Rural	201,20	44.44	168		

The value of 't' is not significant. This shows that urban teachers do not differ from rural teachers in their motivation and classroom practices.

TABLE 8

Significance of 't' between DPEP and non-DPEP Districts in Respect of Teacher Motivation and Classroom Practices

Variable	Category	AM	SD	N	df	't'
Teacher Motivation	DPEP	199 21	28 72	184	222	2.05*
	Non-DPEP	205 65	14 66	40		
Classroom Practices	DPEP	195.60	54.22	184	222	3.89*
	Non-DPEP	212.98	12 68	40		

* Significant

The values of 't' between DPEP and non-DPEP are found to be significant. This indicates that there is significant difference between primary teachers belonging to DPEP and non-DPEP districts in respect of their motivation and classroom practices Further, it is interesting to notice that teachers belonging to the non-DPEP district are superior to their DPEP counterparts in their motivation and classroom practices.

Discussion

Teacher motivation has a significant positive relationship with classroom practices Primary teachers, who are motivated, are effective in their classroom practices. As regards the interrelationship between the dimension of teacher motivation and classroom practices, classroom-teaching dimension of teacher motivation has no significant relationship with all the dimensions of classroom practices except AV aids utility . All the dimensions of classroom practices, except AV aids utility, are independent of classroom teaching dimension of teacher motivation. Similarly, use of operation blackboard kit has no relationship with all the dimensions of teacher motivation. This implies that use of operation blackboard kit is independent and has nothing to do with any of the dimensions of teacher motivation. Excepting classroom teaching and use of operation blackboard kit, there is an inter-nexus between all the other dimensions of teacher motivation and classroom practices.

There is gender difference in classroom practices. Male primary teachers are better than their female counterparts in classroom

practices. There is no gender difference in teacher motivation. Gender is found to have influence of classroom practices but not on motivation. The influence of educational qualification is observed in teacher motivation and classroom practices. Educational qualifications of primary teachers determine their motivation and classroom practices. There is no influence on teaching experience on motivation of primary teachers and their classroom practices. This reveals that teaching experience of primary teachers has nothing to do with their motivation and classroom practices. Similarly, there is no influence of type and location of school on teacher motivation and classroom practices. This implies that type and location of school in which a primary teacher is working may not determine their motivation and classroom practices

A significant difference is observed between primary teachers belonging to DPEP and non-DPEP districts in their motivation and classroom practices. Primary teachers working in the non-DPEP district are superior to their DPEP counterparts in their motivation and classroom practices The reason for this supremacy of the non-DPEP district may be due to the fact that the West Godavari district is a developed district when compared to Vizianagaram in Andhra Pradesh. Further, the intervention of DPEP might have not been fully taken up at the time of undertaking this study. Future researches may focus on whether any improvement taken place due to DPEP interventions after their full implementation

Implications For School Effectiveness

In spite of many innovative strategies of classroom practices available, nowadays, the primary teacher is not able to initiate desired changes in the learners to the fullest possible extent and uis nable to contribute much for school effectiveness. The reasons for this failure may be many but one important and significant reason is, perhaps, lack of proper motivation among primary teachers. This study reveals that the motivation of teachers and their classroom practices are highly related. This substantiates the fact that motivation of teachers in an essential prerequisite for effective classroom practices and, in turn, for school effectiveness.

The educational qualifications of teachers do influence their motivation and classroom practices. This implies that educational qualifications of teachers are important contributing factor to school effectiveness as they are influencing both motivation and classroom practices of teachers. Gender differences are evident in classroom practices. A difference is found between DPEP and non-DPEP in both motivation and classroom practices of teachers. Non-DPEP teachers are more motivated and effective in their classroom practices than DPEP teachers. Training of the DPEP teachers in motivation and classroom practices is essential to improve school effectiveness.

Teaching experience, type and location of school has no influence on motivation and classroom practices of teachers. This implies that a school can be effective irrespective of type and location of school and teaching experience of teachers.

Action Points

- Motivation of teachers is to be improved, as it is an important indicator of school effectiveness.
- A training package to motivate teachers need to be developed.
- Some inputs to motivate teachers may be integrated in teacher training programmes.
- Self-motivational techinques are to be designed.
- Effective academic supervision is necessary to improve the classroom practices of teachers.
- Educational officers need to be trained for effective academic supervision

SECTION V

Classroom Climate and School Effectiveness

The studies discussed in this section include:

- A Comparative Study of Classroom Climate in DPEP and Non-DPEP Schools of Kerala
- School Effectiveness and Learning Styles of Primary School Children
- Effectiveness of Cognitive Strategies in Developing Reading Skills among Primary School Students

15

A Comparative Study of Classroom Climate in DPEP and Non-DPEP Schools of Kerala

P. Viswanadhan Nair

The study aimed at comparing the sub-dimensions of classroom climate and the total classroom climate in DPEP and non-DPEP districts in Kerala. The classroom climate of 188 classrooms from DPEP and 216 classroom from non-DPEP districts were observed. The study revealed that the classroom climate in the DPEP classrooms was better than in the non-DPEP classrooms. The DPEP intervention strategies like regular in-service training, teacher support material, regular monitoring and supervision were found to be helpful in improving classroom climate.

Introduction

The district Primary Education Programme (DPEP) which was approved by the Planning Commission as a Centrally sponsored scheme was implemented in selected districts in seven States of the country in 1994. The programme which is intended to universalise elementary education in the country is also a parallel attempt to decentralise educational planning and management as envisaged in the National Policy on Education (1986) and the Programme of Action (POA, 1992). The DPEP directly touches critical parameters in the whole scheme of primary education and also causes reverberations in other significant concerns. Together, it is the process of primary education that is being revamped, giving a new meaning to the

relationship between inputs and outputs, at times changing their very categorisation.

"DPEP is not an enclave project. It is a major and multifaced programme seeking to overhaul the primary education system in the country" (DPEP guidelines, 1997). It is also stated that due to the addition of responsibilities and functions, DPEP is likely to emerge as an intermediary financial, technical and resource organisation, which may well develop into an educational fund/bank for primary education development in the country. The Government of Kerala was one of the Indian States to implement the programme It introduced the DPEP curriculum in three districts, namely, Kasargod, Malappuram and Wayanad as Phase I of the programme in 1996. It has been introduced as a major multifaced educational programme which seeks to overhaul the entire primary education system in the country.

Objectives of DPEP

The DPEP was mainly intended to develop a replicable, sustainable and cost-effective programme for primary education which would transform the primary education system and infuse new life into the system. The specific objectives of the DPEP are:

1. To reduce differences in enrolment, drop-out and learning achievement among gender and social groups to less than five per cent,

2. To decrease the overall drop-out rate to less than ten per cent,

3. To increase average primary learning achievement by at least 25% per cent over the measured baseline by ensuring achievement of basic literacy and numeracy competencies and a minimum of 40 % achievement levels in other competencies by all primary school children;

4. To provide to national norms access for all children to primary classes (I-IV in Kerala), i.e., primary schooling, wherever possible, or its equivalent non-formal education

Traditional Classroom Teaching

Conception without perception is empty and perception without conception is blind. Our present traditional classroom situation is not far from the above saying Throughout the classes, teachers dominate while students sit passively. Here the teachers give instructions,the students are to follow the instructions. The teachers ask questions and students answer them. Teachers impose discipline and students accept discipline Teachers organise activity and students wait for instructions

Mehta has rightly portrayed the existing traditional classroom teachings as "new methods of teaching of science and mathematics recommended as essential ingredients of the primary curricula were being ignored in many States, and most of the schools did not have even the relatively inexpensive teachings kits developed by the NCERT.By and large, the methods of teaching were also quite outmoded Very often, this encouraged children to memorise the contents of books and the expected question-answers" (Govinda and Varghese, 1993).

How is the DPEP Approach Different?

The DPEP is different from the traditional teacher-dominated classroom teaching. This programme is intended to create a more effective learning environment by encouraging the social, physical and mental development of the children, utilising their own learning strategies and social experience. It is essentially learning through the environment, from the environment, using the play-way method. It provides opportunity for peer-tutoring and generates competitive learning situations The new approach encourages greater participation of children in learning. There is immense scope for learning through observation and discovery, using locally available resources. In fact, DPEP develops greater self-dependence and creative ability among the children.

The DPEP instructional strategies are based on accepted psychological approaches often ignored in traditional classrooms. The method of teaching in DPEP is based on practical experiences and hence is more meaningful to the children. The teachers get greater opportunities to find out the difficulties of each child and help him/her to overcome such difficulties. Learning becomes

more enjoyable and effective for young children. It promotes and encourages them to take up responsibilities in their life. The basic skills such as listening, speaking, reading writing, observing, describing, interacting, etc., are acquired not through classroom teaching but through individual and group activities.

The present DPEP system is the emancipation from the old traditional method of rote- learning and mere memorisation of facts. Basically, the child is active, and therefore activity-based learning will cater to the needs of a child physically and psychologically.

DPEP is the best scientific method for the education of our children, for it encourages in actual experience being able to solve one's problems and paves the way for developing "thinking children".

In traditional education the children are regarded as receivers of knowledge and information passed on to them by teachers. In the DPEP programme, the child is the focus of education and the teacher's role is to create suitable experiences so that the children acquire skills, develop concepts and form attitudes which are necessary for living.

If students have to learn with understanding, then the transfer of information alone is not enough. For effective learning the students have to be involved in learning tasks. Therefore, we would agree that teaching should be information input plus learning activities. This is the basic philosophy of the child-centered activity-based DPEP programme.

In DPEP the teacher is no longer regarded as one who provides a suitable learning situation in his pursuit of knowledge. Teachers should encourage children to question the different concepts, relating and applying the same concepts in everyday life. The duty of the teacher in DPEP education is to guide the children by giving necessary assistance to their self-discovery. The teacher really becomes a guide and philosopher in the class rather than a dictator.

Need for Empirical Study of the Efficacy

The efficacy of any new methods is to be tested before a new system can be widely implemented. The drawbacks, if any, of

the new system have to be rectified before it is accepted for national adoption. Educational reforms must be made at school level along with system level, As Guhan (1985) points out the gap between well-intended policies and poor implementation has to be expected, their multiple reasons identified and checks provided to enable 'effective and efficient' implementation with minimum loss of achievement in the process of implementation.

The movement from the study of product parameters of quality in primary education to process parameters is taking place. As Shaeffer (1997) states, "more recently quality has been defined in relation to the nature of the educational process. Thus, the proper organisation of a lesson, the correct use of the texts and homework, the encouragement of child-centered learning, the absolute amount of the time spent on a task, all of these are seen as defining the quality of education as a process".

The present study has been designed against this background It focuses on an important component of quality in primary education "Classroom Climate".

What is Classroom Climate?

Classroom climate refers to the generalised attitude of the pupils towards the teacher and the class that the pupils share in common in spite of individual differences. It is a salient factor which determines the patterns of interaction in the classroom. As a result of participating in classroom activities, pupils soon develop shared expectations about how the teacher will act, what kind of person he is, and how they like their class. Classroom climate is assessed by analysing teacher-pupil interaction and predicting the quality of classroom interaction. Because the teacher is such a critical member of the group, his behaviour will be most important in the climate setting, particularly in the earlier state of the development of the group. In recent years the importance of psychological climate in which a group works has been strongly emphasised in the educational literature.

"Implementation is not a process that follows automatically once a policy has been formulated, but it is often a difficult and frustrating affair, full of pitfalls" says Quade (1975). As Guhan

(1985) pointed out, the gap between well-intended policies and poor implementation has to be expected, their multiple reasons identified and checks provided to enable 'effective and efficient' implementation with minimum loss of achievement in the process of implementation.

When a new observer comes into a group for the first time, he is able to sense a feeling about the group which we might call an 'atmosphere' or a 'climate' The term "classroom climate" has been employed to comprehend the complexities of the teaching-learning process, both cognitive as well as attitudinal and adjustive.

Though classroom climate has many aspects, the climate here is assessed by analysing teacher-pupil interaction and predicting the quality of classroom interaction.

There is scientific evidence to prove that classroom climate with its complex pattern of interpersonal attitudes affects the learning process qualitatively and quantitatively. Studies like those of Perkins(1951), Rippy (1960), Nair (1967) and Rodriguez (1967) found that the quality of teacher-pupil relations was a major determiner of classroom climate.

Hypothesis

The present study has been designed round the major hypothesis that "each of the sub-dimensions of the Classroom Climate (Total) will discriminate significantly between DPEP and Non-DPEP primary classes".

Specific Objective

The hypothesis set for the study helped the investigator to define the major objective of the study as follows.

- To compare the sub-dimensions of Classroom Climate and Classroom Climate (Total) for DPEP and Non-DPEP primary schools selected for the study

Research Questions

The following are the major research questions that the study will focus on.

1. Are the sub-dimensions of classroom climate similar/different for DPEP and Non-DPEP primary classes?
2. Are DPEP strategies helpful in developing the sub-dimensions of Classroom Climate used in the present study?

Methodology

Sample

Three DPEP districts (Kasargod, Malappuram and Wayanad) and three Non-DPEP districts (Palakkad, Idukki and Thiruvananthapuram) were selected for the present study. Among the 68 DPEP schools selected, 23 were from Kasargod, 27 from Malappuram and 18 from Wayanad Similarly, 71 Non-DPEP schools were chosen (20 schools from Palakkad, 18 schools from Idukki and 33 schools from Thiruvananthapuram). All the schools in the DPEP and Non-DPEP districts were selected through stratified random sampling from the list obtained from the DPEP office. The criteria for stratification was locality of the schools, namely, urban, rural in the ratio 1:4. In addition, the management dimension (government and private) was also considered in selecting the schools. A total of 188 classes (Standard IV) from DPEP schools and a total of 216 classes from the Non-DPEP schools were observed by the investigator and necessary entries were marked on the Classroom Climate Scale. Two to four classes were observed from each selected school. Of the 188 classes observed in DPEP schools, 52 belonged to male teachers and 136 belonged to female teachers. Similarly, among the 216 classes observed in the Non-DPEP schools, 62 belonged to male teachers and 154 belonged to female teachers.

Classroom Climate Scale

The classroom climate was measured using a Classroom Climate Scale prepared by the experts of the Department of Education, University of Kerala. This scale consists of 16 sub-dimensions, namely 'group feeling in the class', 'diversity in thinking', 'obedience to class rules', 'speed in doing classwork', 'physical environment (space ventilation, etc)', 'academic environment (study materials)', 'tense situation in the class', 'favouritism

shown to students', 'clique formation in the class', 'satisfaction in doing classwork', 'disorganisation in the class', 'difficulty in doing classwork', 'indifference towards classwork', 'democratic approach in doing classwork', and 'competitive spirit in the classroom'. The above 16 sub-dimensions were marked on a three-point scale, viz. 'to a great extent', ' to some extent' and 'not at all'. A score of 3 is assigned to a response 'to a great extent', a score of 2 is assigned to a response 'to some extent' and a score of 1 to a response 'not at all'. The reliability and validity of the classroom climate scale show that the scale is a valid and reliable one for measuring the classroom climate of primary school classes.

Statistical Techniques Used

1. Analysis of Variance test (One-way classification)
2. Critical Ratio test

Analysis and Discussion

The collected data were to be analysed to throw light on the basic question taken up for the study to what extent the DPEP classrooms are more effective than Non-DPEP classrooms in respect of developing a better classroom climate in each of the sixteen sub-dimensions of this variable. The data and results of analysis of variance test and test of significance of difference between means scores for DPEP and Non-DPEP groups are presented in Table 1. The results in respect of each of these sub-dimensions and the total dimension are discussed below:

A. Impact of DPEP Strategies on the Sub-Dimensions of Classroom Climate

Group feeling in the class

One-way analysis of variance of the scores of this sub-dimension of classroom climate showed that the two groups (DPEP and Non-DPEP groups) differed significantly in respect of this variable since the obtained F-value (F=643.73) exceeded the level set for significance at 0 01 level (F=6.70). The mean difference of the two groups was also compared which yielded a critical ratio 16.603, which again exceeds the level set for significance at 0.01

level (CR=2.58). It may be concluded that the DPEP strategies are extremely helpful in developing this aspect of classroom climate

Diversity in thinking

The DPEP and Non-DPEP groups differed significantly with respect to the sub-dimension of classroom climate 'diversity in thinking' since the obtained F-value (F=70.133) far exceeded the value set for significance at the 0.01 level (F=6 70). Comparison of the mean scores of this sub-dimension for the two groups (DPEP and Non-DPEP) yielded the critical ratio (8.558) This value is far greater than 2.58, the level set for significance at 0.01 level. Hence we can infer that 'diversity in thinking' may be developed as a result of practising DPEP strategies in our classrooms.

Obedience to class rules

The scores of this sub-dimension of classroom climate for DPEP and Non-DPEP groups were analysed using analysis of variance The obtained F-value 0 004 was found to be far lesser than the level set for significance at 0 05 level (F = 3.86). The critical ratio obtained (CR = 0.238) was also far below the level set for significance at the 0.05 level. It may be, therefore, inferred that DPEP strategies are not helpful in developing this aspect of classroom climate.

Speed in doing classwork

The interpreted F-values to be exceeded for significance were worked out for the .05 level and 0.01 level. These are 3 86 for the .05 level and 6.70 for the 0.01 level of significance. The obtained F-value of this sub-dimension of classroom climate (F = 1.886) was far lower the level set for significance. The critical ratio is 1.472, which is far lower than the level set for significance at 0.05 level. Hence DPEP strategies are not helpful in developing this aspect of classroom climate, namely, 'speed in doing classwork'.

Physical environments (space, ventilation, etc.)

DPEP and Non-DPEP classes did not differ significantly in respect of this aspect of classroom climate since the obtained F-value (F = 3.738) did not exceed the value set for significance at 0 05

TABLE 1

Classroom Climate: Data and Results of Analysis of Variance and Test of Significance for DPEP and Non-DPEP Classrooms

S	Sub-dimensions of Classroom (N2 = 216)	DPEP and Non-DPEP Critical Ratio Between Sum of Squares	Within Sum of Squares	Between Mean Squares	With in mean Squares	F-value	DPEP (N1=188)		Mean	Non-DPEP	
M1	S D	Mean S D									
1	Group feeling in the class	110 018	68 972	110 078	0 171	643 731**	2 787	0 5026	1.741	0 8093	16 603**
2	Diversity in thinking	43 623	249 989	43 623	0 622	70 133**	2 261	0 752	1 602	0 816	8 558**
3.	Obedience to class rules	0 02	2002 384	0.02	4.981	0 004	2 362	0 665	2 347	0 684	0 238
4.	Speed in doing classwork	0 664	141 66	0 664	0.352	1 886	2 234	0 514	2 153	0 653	1 472
5	Physical environment (space, ventilation, etc)	1 54	165 576	1 54	0 412	3 738	2/276	0 573	2 153	0 94	1 952
6	Academic environment (study materials)	23 197	212 771	23.197	0 529	43 851**	2 170	0 629	1 690	0 800	6 760**
7	Tense situation in the class	17 6	248 638	17 6	0 618	28 479**	1 915	0 846	2 330	0 728	-5 24**
8	Goal direction (students)	17.509	237.073	17 509	0 589	29 691**	2 255	0 855	1 838	0 724	5 4165**
9	Favouritism shown to the students	11 274	349 023	11 274	0 868	12 985**	1 702	0 797	2 037	0 744	-4 345**
10	Clique formation in the class	0 759	269 053	0 759	0 669	1 133	1 829	0 753	1 917	0 867	1 078
11.	Satisfaction in doing classwork	22 433	207 082	22 433	0 515	43 548**	2.234	0 749	1 815	0.766	5 550**
12	Disorganisation in the class	34 935	211 944	34 935	0 542	64 456**	1 702	0.769	2 292	0.703	-8 004**
13	Difficulty in doing classwork	14.599	240 161	14 599	0 597	24 437**	1 596	0 689	1 977	0 836	-5 023**
14.	Indifference towards classwork	22.564	236 634	22 564	0 589	38 332**	1 702	0 797	2 176	0 737	-6 173**
15	Democratic approach in doing classwork	19.917	218 962	19 917	0 545	36 568**	2 255	0 728	1 810	0 743	6 068**
16	Competitive spirit in the classroom	18.049	260 713	18.049	0.649	27 831**	2 340	0 752	1 917	0 846	5 332**
17	Classroom Climate Total	20.947	4029 515	20 947	0 624	33 590**	2 101	0 781	1 987	0 797	5 821**

df Between = 1 F- Value for 0 01 level = 6 70 ** indicates significance at 0 01 level
df Within = 402 Critical ratio value for 0.01 level = 2 58

level (F = 3 86). The obtained critical ratio (CR = 1.952) is less than 1 96, the level set for significance at 0 05 level. So it may be concluded that DPEP strategies had not helped in developing this aspect of classroom climate

Academic environment

This sub-dimension of classroom climate for the two groups (DPEP and Non-DPEP) differed significantly since the obtained F1-value (F = 43 851) far exceeded the level set for significance at 0.01 level (F = 6.70). The mean difference of the two groups was also compared which yielded a critical ratio 6.760, which exceeds the level set for significance at the 0.01 level. (CR = 2.58). It may be concluded that the DPEP strategies are extremely useful in developing this aspect of classroom climate.

Tense situation in the class

One-way analysis of variance of the scores of this aspect of classroom climate showed that the two groups (DPEP and Non-DPEP groups) differed significantly since the obtained F-value (F = 28.479) far exceeded the level set for significance at 0.01 level (F= 6 70) The critical ratio obtained for the two groups (CR = 5.27) far exceed the level set for significance at 0.01 level. The critical ratio value is negative and hence we may conclude that the DPEP strategies are extremely helpful in reducing 'tense situation in the classroom'

Goal direction (Students)

This sub-dimension of classroom climate for the two groups (DPEP and Non-DPEP groups) differed significantly since the obtained. F-value(F = 29.691) far exceeded the level set for significance at 0.01 level (F = 6 70). The mean difference of the two groups was also compared which yielded a critical ratio of 5.416 which exceeds the level set for significance at the 0.01 level This is conclusive evidence that the DPEP strategies are extremely useful in developing this aspect of classroom climate.

Favouritism shown to students

The DPEP and Non-DPEP groups differed significantly with respect to this sub-dimension of classroom climate since the analysis of variance yielded F-value (F = 12 985) which exceeds

the level set for significance at 0 01 level. The critical ratio was found to be (CR = -4.345) significant far beyond the level set for significance at the 0.01 level. Here the higher mean is for Non-DPEP classrooms and hence we may conclude that the DPEP strategies are helpful in reducing 'favouritism shown to students'.

Clique formation in the class

DPEP and Non-DPEP classes did not differ significantly in respect of clique formation in the class since the obtained F-value (F = 1 133) not exceeded the value set for significance at 0.05 level (F = 3.86). It was seen that the value of the critical ratio (CR = 1 078) is lower than the level set for significance at 0 05 level It may be concluded that DPEP strategies have no role in determining this sub-dimension of classroom climate

Satisfaction in doing classwork

One-way analysis of variance of the scores of this aspect of classroom climate showed that the DPEP and Non-DPEP groups differed significantly since the obtained F-value (F = 43 548) far exceeded the level set for significance at 0.01 level. The mean difference of the two groups was also compared which yielded a critical ratio(CR = 5.55) which exceeds the level set for significance at 0.01 level. It may be concluded that the DPEP strategies are extremely helpful in developing this aspect of classroom climate

Disorganisation in the class

This sub-dimension of classroom climate for the two groups (DPEP and Non-DPEP groups differed significantly since the obtained F-value (F= 64.456) far exceeded the level set for significance at 0.01 level (F=6.70). The mean difference of the two groups was also compared which yielded a critical ratio (CR = -8 004) that far exceeded the level set for significance at 0.01 level It may be concluded that the DPEP strategies are extremely helpful in minimising disorganisation in classrooms.

Difficulty in doing classwork

One-way analysis of variance of the scores of this sub-dimension of classroom climate for DPEP and Non-DPEP group differed significantly since the obtained F-value (F = 24 437) far exceeded the level set for significance at 0.01 level The critical ratio obtained

was -5.023. This value is far great than 2 58. Hence the obtained critical ratio is highly significant (0 01level) Since the critical ratio value is negative. we may conclude that the DPEP strategies are helpful in reducing 'difficulty in doing class work.'

Indifference towards classwork

This sub-dimension of classroom climate for the two groups (DPEP and Non-DPEP groups) differed significantly since the obtained F-value (F = 38 332) far exceeded the level set for significance at 0.01 level. The mean difference of the two groups was also compared which yielded a critical ratio of 6.173 which exceeds the level set for significance at 0.01 level. It may be concluded that the DPEP strategies are helpful in lowering indifference towards classwork

Democratic approach in doing classwork

This sub-dimension of classroom climate for the DPEP and Non-DPEP groups differed significantly since the obtained F-value (F = 36,562) far exceeded the level set for significance at 0 01 level. The mean difference of the DPEP and Non-DPEP was also compared which yielded a critical ratio of 6.068 which exceed the levels for significance at .0 level. Hence, we may conclude that the DPEP strategies are extremely helpful in developing this aspect of classroom climate.

Competitive spirit in the classroom

The DPEP and Non-DPEP groups differed significantly with respect to this sub-dimension of classroom climate since the obtained F-value (F = 27.831) for exceeded the value set for 0.01 level significance. Comparison of mean scores of this sub-dimension yielded a critical ratio of 5.332 The obtained value was found to be far exceeding the level set for significance at the 0.01 level. It may be concluded that the DPEP strategies are extremely useful in developing competitive spirit in the classroom.

Impact of DPEP strategies on Classroom Climate

One-way analysis of variance of the total scores of sixteen sub-dimensions of classroom climate showed that the two groups

(DPEP and Non-DPEP groups) differed significantly in respect of the variable 'Classroom Climate' since the obtained F-value (F = 33.590) far exceeded the level of significance at 0.01 level (F = 6.70) The mean score difference of the two groups was also compared. The critical ratio obtained was 5.821, which exceeds level set for significance at 0.01 level (CR = 2 58) It may be concluded that the DPEP strategies are extremely helpful in developing better classroom climate

Conclusion

Among the sixteen sub-dimensions included in the Classroom Climate Scale, twelve sub-dimensions differed significantly between DPEP and Non-DPEP classrooms. The significant sub-dimensions of the classroom climate scale have been arranged in the decreasing order of importance on the basis of the absolute values of critical ratios. Comparing the magnitude of the mean scores of the significant sub-dimensions obtained for DPEP and Non-DPEP groups, we may conclude that the DPEP strategies are extremely helpful in developing the following sub-dimensions of the classroom climate:

1. Group feeling in the class (CR = 16 603)
2. Diversity in thinking (CR = 8 558)
3. Academic environment (CR = 6.760)
4. Democratic approach in doing classwork (CR = 6.068)
5. Satisfaction in doing classwork (CR = 5 550)
6. Goal direction(Students) (CR = 5.416)
7. Competitive spirit in the classroom (CR = 5.332).

Also, comparing the magnitude of the mean scores of the significant sub-dimensions we may conclude that the DPEP strategy is helpful in decreasing the characteristics of the following sub-dimensions of the classroom climate:

1. Disorganisation in the class (CR = 8.004)
2. Indifference towards classwork (CR = -6.173)
3. Tense situation in the class (CR = -5.240)

4. Difficulty in doing classwork (CR = -5.023)
5. Favouritism shown to students (CR = -4 345).

Sub-dimensions of the classroom climate for which no significant differences were noted are the following:

(i) Physical environment

(ii) Speed in doing classwork

(iii) Clique formation in the class

(iv) Obedience to class rules.

Discussion

Among the sixteen sub-dimensions included in the Classroom Climate Scale, DPEP strategies are found to be helpful in developing seven sub-dimensions in the classroom. They are 'group feeling in the class', 'diversity in thinking', 'academic environment', 'democratic approach in doing classwork', 'satisfaction in doing classwork', 'goal direction (students)', and 'competitive spirit in the classroom'.

It was also seen that DPEP strategies are helpful in reducing certain characteristics of five sub-dimensions of the classroom climate, namely, 'disorganisation in the class', 'indifference towards classwork', 'tense situation in the class', 'difficulty in doing classwork' and 'favouritism shown to students'.

DPEP is an activity-oriented programme. In the DPEP system each pupil discarded his individuality and assumed the social consciousness. Because of group dynamism common in DPEP classes, a collective mind was formed, and as a member of the group each pupil started thinking and acting in the manner as others did.

In DPEP classes, the pupils were encouraged to give a variety of answers as against convergent thinking. Autonomy and flexibility were found to be common in DPEP classes, which make pupils more divergent in their thinking processes. Pupils' engagement was found to be higher in teacher-led small groups in DPEP.The grants given to teacher were utilised in improving school facilities by purchasing books, journals, study materials, etc.

In DPEP, class activities were directed, structured and focussed towards accomplishing the goals of pupils. Each pupil had the feeling that his ideas and suggestions have been heard. In DPEP classes, pupils had the opportunity of independently practising the skills they were required to learn. Again, the teacher in a DPEP school was alert to differences in individual thoughts and feelings. The pupils were getting encouragement from a skilled, knowledgeable adult who could influence the pupils in positive ways The democratic approach practised by the majority of the teachers in DPEP classes accounted for pupils' satisfaction in doing classwork. Because of individualised activity-oriented DPEP programmes, the pupils were always busy in their learning activities and hence fully organised the classroom set-up in the classes.

The teacher in a DPEP class was tactful in dealing with pupils The teacher was benevolent and friendly, encouraged group activities, exchanged ideas with pupils and asked the opinion of pupils. The teacher showed confidence in pupils' integrity. In DPEP classes the teacher treated all pupils in an equitable and impartial manner, used a realistic standard, and the pupils felt more respected

Many of the teachers in DPEP schools have undergone in-service training. The number of teachers who have undergone in-service training under DPEP had increased over the years reaching nearly 100% in 1997. The theme for the majority of the in-service training programme was 'content enrichment', 'student evaluation', 'use of instructional materials', 'activity-based joyful learning' and 'general training'.

The DPEP strategies are found not helpful in developing four sub-dimensions included in the Classroom Climate Scale. They are 'physical environment', 'speed in doing classwork', 'clique formation in the class' and 'obedience to the class rules'. The fact that these sub-dimensions are not influenced by DPEP and Non-DPEP practices is not easily explained. A partial explanation for the absence of any significant relation is that DPEP strategy is not capable of changing the existing classroom climate. However, more elaborate studies will have to be conducted before we can attempt a more detailed and dependable interpretation of the findings.

Tenability of the Hypothesis

From the findings of the study, it was seen that the hypothesis formulated for the present study has been considerably substantiated.

Recommendations

A majority of the teachers in DPEP schools had in-service training programmes more than three times conducted by BRC or SCERT. Hence, the better classroom climate in DPEP schools may be impact of the training programmes organised teachers. Hence proper in-service training should be given to all primary school teachers.

In DPEP districts, the majority of the teachers and head teachers received a contingency grant for preparation of teaching-learning materials Most of the teachers utilised the amount for preparation of teaching-learning materials which might have a direct impact in the achievement of students in DPEP schools. Hence, a sufficient contingency grant should be provided to teachers working in Non-DPEP schools.

Reading aloud, checking of classwork by teachers, giving homework were the different instructional activities adopted by teachers in the DPEP classes. Hence, proper orientation should be given to teachers in Non-DPEP classes.

Activity-based teaching has to be implemented in all primary schools. Hence the primary school curriculum has to be modified to contain more activity.

There is an urgent need for a guidance programme to be organised for primary schools.Vocational self-concept begins to develop in these years and become a strong motivator for academic achievement. Interesting, imaginative programmes which provide information, guidance and counselling—personal, educational and vocational should be organised.

The routine mind sets of teachers on the varying aspects of teaching need to be shaken up and re-oriented for divergent thinking, searching for situations in different perspectives, teaching for new alternatives through brainstorming seminars

Basic teaching materials are seen to be available in most DPEP schools. A redefinition of what is basic needs to be made.Also, the stress in future has to be on providing enrichment materials, which are lacking at present in most of primary schools.

The minimum norms for physical space and physical facilities for schools have to be fixed taking into consideration the requests of a changed curriculum. The one-to-one relationship between rooms and classes should be reordered to include work space, activity areas and storage space The minimum conditions and facilities have to be assessed against the change requirements of DPEP.

Primary education has to be viewed separately in terms of curriculum development, teaching strategies, teacher training, teacher qualifications and competencies, evaluation procedures, administrative requirements and several other aspects that form part of the system. A delinking is necessary for making primary education child-centred in the true sense of the term and to make it free from the clutches of adult modes of teaching, learning and evaluation

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16

School Effectiveness and Learning Styles of Primary School Children

C.Jangaiah

The author aimed at studying the effect of Cognitive Styles (field-dependence - independence) and locus of control (external and internal) of primary school children on their achievement in environmental studies (EVS). Sixty-two children from government schools and sixty from private schools were assessed for cognitive styles and locus of control. The study revealed that children having internal locus of control demonstrated better achievement. The private schools showed more field independence than government schools

Introduction

A consistent preference for a method or for a particular mode of learning and information-processing indicates that it is a part of an individual's way of cognitive action or rather his/her cognitive style. Cognitive styles appear to be a particular important dimension to assess for educational purpose since they provide a basic for improved instructional purposes such as matching the student to the teacher and teaching method,or the fostering of attention modes of cognitive and stylistic approaches to problem-solving. There are ten styles extensively studied

(a) Field-independence vs. Field-dependence

(b) Reflection vs. Impulsivity

(c) Convergence vs. Divergence

(d) Levelling vs Sharpening

(e) Verbalisers vs Visualisers

(f) Serialist vs Holist

(g) Confidence vs. Caution

(h) Conceptual style

(i) Category width

(j) Cognitive complexity

The present study deals with a single cognitive style, namely, field-independence and field-dependence. Individual differences between them arise with respect to what the individual sees in his surrounding visual field and what he feels within his body. The field-dependent child has a better social orientation, chooses socially-oriented subjects like arts and humanities, prefer a global way of information-processing, and usually has an external locus of control. On the other hand the field-independent child shows both physical and psychological distance from people, chooses abstract and analytical subjects like mathematics, science, prefers an articulated way of information-processing, and usually has an internal locus of control. Just as individual differences are seen in cognitive styles, individuals differ in the degree to which they believe that they can control what happens to them. Some persons believe that their success or failure depends on their own effort. Such persons are said to have an internal locus of control

On the other hand, some people believe that success or failure are controlled by powerful others (parents, teachers, etc.), and that their own effort has little influence on what happens to them. Such persons are said to have an external locus of control.

Present Study

The present study aims at studying the functioning of cognitive style (field dependence- independence) in Standard V students of two government schools and two private schools of Trichy district. It attempts to find out the effect of cognitive style of students on their achievement in EVS-I and EVS-II. It further tests the relationship between gender, the type of school and locus of control (external and internal) with the cognitive style of the students. The study also tries to find out the effect of locus

of control (external and internal) on the achievement of students in EVS-I and EVS-II.

Statement of the Problem

The present study is entitled as "Relationship among cognitive styles, locus of control and scholastic achievement (in EVS-I and EVS-II) of Standard V students of Trichy District,Tamil Nadu."

Objectives

- To determine the effect of cognitive style primary school children on their achievement in EVS.
- To study the relationships among gender and the field dependence-independence of primary school children.
- To study the relationships among locus of control in primary school children and their field dependence-independence.
- To study the relationships among the type of school (government/private) and the field dependence-independence of primary school children.
- To determine the effect of locus of control(external and internal) of primary school children on their achievement in EVS.

Hypotheses

1. Cognitive style of primary school children has no effect on their achievement in EVS.
2. There is no significant relationship between gender and the field dependence-independence of primary school children
3. There is no significant relationships between locus of control in children of primary school children and their field dependence-independence.
4. There is no significant relationships between the type of school (Government/Private) and the field dependence-independence of children of primary schools
5. Locus of control (external and internal) of primary school children has no effect on their achievement in EVS

Methodology of the Study

The present study is an ex-post-facto type study wherein correlational analysis is used to find out the relationship among cognitive style (field dependence-independence), locus of control, the type of school (government/private), gender and scholastic achievement(in EVS-I and EVS-II)

Sample and Sampling Procedure

A representative sample of 120 children from Standard V was selected from four primary schools of Trichy district. The children from the different types of schools, namely,two government (60) and two private (60) schools were selected by through the random sampling technique. The four schools were selected by purposive sampling. Fifteen boys and 15 girls were selected from each school. The schools selected were:

1. R S.K. Primary school
2. Boiler Plant Primary School
3. Boiler Plant Tamil Medium School
4. Vivekananda Primary School

Data regarding gender and the scholastic achievement were collected from the school records.

Description of Tools Used for the Study

Embedded-Figures Test

This is the standardised test developed by Witkin for determining the field dependence-independence in children. The split-half reliability of the test was found to +0.76 for males and +0.08 for females, both with respect to the Indian population. The test consists of 24 complex figure and 8 simple figures. The subject has to locate the simple figure in each of the complex figure with instructions that the figure to be located should be of the same size and proportion as the simple figure. The maximum time given to locate the smaller figures in the complex figure is 5 minutes. If a student could locate 15 items and more out of the 24 complex items, he was considered field-independent. If he scored below 15, he was considered to be field-dependent.

Locus of Control Questionnaire

The locus of control questionnaire consists of 13 questions. Each of the questions contains two alternatives from which the students has to select. There are a few questions testing the students in the direction of internal locus of control (1,4,6,7and 11), while questions 2,5,9,10, and 12 test the students in the direction of external locus of control. The third type of questions (3,8,13) asks the students whether he believes he can take any action to deal with certain problem situations.

The questions were read to the students individually, one after the other. If a student scores a minimum of 8 out of the 13 questions in the direction of internal locus of control then he has an internal locus of control. If a student scores below a score of 8, then he has an external locus of control

Method of Analysis

The present study is an ex-post-facto study.Two different statistical approaches were used to test the hypotheses.

The 't'-test was used to test the effect of cognitive style of Standard V students on their achievement in EVS. The hypothesis was tested separately for EVS-I and EVS-II by formulating two sub-hypotheses.

The Chi-square test was used to find out the relationship between gender and field-dependence-independence of students and also to find out the relationships between type of school (government/private) and field dependence-independence. The Chi-square test was repeated to find out the relationships between locus of control in children and their field-dependence-independence.

The 't'-test was used again to test the effect of locus of control (external and internal) of the students on their achievement in EVS. The hypothesis was tested separately for EVS-I and EVS-II by formulating two sub-hypotheses for achievement in EVS.

The analysis of data is conducted to draw a logical inference concerning the tenability of the hypotheses which states the possible interactions between the dependent and independent variables. It is to be noted that the investigator might not have had sufficient information of all variables and events that were

operating upon the Standard V students of the four primary schools of Trichy district at the time of the study.

The hypotheses stated earlier in this paper are presented one by one with tests for significance using appropriate techniques, in the following tables.

TABLE 1

Significance of Difference of Means between Field-Dependent and Field-independent Students in Respect of Their Performance in EVS-I

Category	*Mean*	*S.D*	*N*	*t*	*Remarks*
Field-dependence	67.99	221 53	106	3 52	Significant
Field independence	82.93	13.82	14		

TABLE 2

Significance of Difference of Means between Field-Dependent and Field-Independent Students in Respect of Their Performance in EVS-II

Category	*Mean*	*S.D.*	*N*	*t*	*Remarks*
Field- dependent	71.77	21.07	105	2 65	Significant
Field independent	82 73	13 89	15		

TABLE 3

Result of Chi-Square Test Showing Relationships among Gender and Field-Dependence-Independence

Gender	*Number of Field-Independent Students*	*Number of Field-Dependent Students*	*Total*	*Chi-square*	*df*	*Level of Significance*
Females	3	55	58	4.89	1	Significant at 0.05
Males	12	50	62			
Total	15	105	120			

TABLE 4

Result of Chi-Square Test Showing Relationships among Locus of Control and Field-Dependence-Independence

Cognitive Style	*Students with External Locus of Control*	*Students with Locus of Control*	*Total*	*Chi-Square*	*df*	*Level of Significance*
Field dependents	3	55	58	4 89	1	Significant at 0 05
Field independents	12	50	62			
Total	15	105	120			

TABLE 5

Result of Chi-Square Test showing Relationships among Type of school and Field Dependence-Independence

Type of School	*Number of field-Dependent Students*	*Number of Field-Independent students*	*Total*	*Chi-Square*	*df*	*Level of Significance*
Government	57	3	60	5 914	1	Significant at 0 05
Private	48	12	60			
Total	105	15	120			

TABLE 6

Siginficance of Difference of Means between Students with External-Internal Locus of Control in Repsect of Their Performance in EVS-I

Category	*Mean*	*S.D.*	*N*	*t*	*Remarks*
External locus of control	65 15	20.68	76	2.68	Significant
Internal locus of control	75.65	20 67	44		

TABLE 7

Siginficance of Difference of Means Between Students with External-Internal Locus of Control in Respect of Their Performance in EVS-II

Category	*Mean*	*S.D.*	*N*	*t*	*Remarks*
External locus of control	69.90	20.96	76	2.33	Significant
Internal locus of control	78.59	18.99	44		

Major Findings of the Study

The cognitive style of primary school children has an effect on their achievement in EVS.

The mean performance in EVS-I of field-dependent and field-independent students differs significantly at 0.05 level with the field-independent students showing better achievement than field-dependent students

The mean performance in EVS-II of field-dependent and field-independent students differs significantly at 0.05 level with the field-independent students showing better achievement than field-dependent students.

There is a significant relationship between gender and the field dependence-independence of primary school children.

There is no significant relationship between locus of control of primary school children and their field-dependence-independence.

There is a significant relationship between type of school (government/private) and the field-dependence-independenceof primary school children.

Locus of control (external and internal) of primary school children has an effect on their achievement in EVS.

The mean performance in EVS-I of students with an external locus of control and students with an internal locus of control differs significantly at 0.05 level The students with an internal locus of control showed a better achievement than those with an external locus of control.

The mean performance in EVS-II of students with external locus of control and students with an internal locus of control differs significantly

at 0.05 level. Students with an internal locus of control showed a better achievement than those with an external locus of control.

Conclusions and Implications for School Effectiveness

The learner's capabilities are a congruence of many factors, both internal and external to the individual Learning style or the learner's disposition of required skills, knowledge and attitudes indicate to us the inclination of the individuals in terms of directions and level of learning disposition.An individual or any learner is subjected to distraction, both from within and without Development both at "self" and "social" levels ought to bring in the mobility/transition towards equilibrium by overcoming such distractions. For this an individual is required to gain control over extraneous distracting factors rather than being controlled by them Thus, on the cognitive style front one needs to be field-independent and on the locus of control front one needs to have 'internal control'.

The highlight of the present study is that a majority of the children who study in private school are found to be field-independent and a majority of thier counterparts studying in government schools are found to be field-dependent It is a common observation, that the teaching-learning transaction, instructional material and physical facilities in a private school are better than those of a government school. The facts observed during the course of this study are clearly illustrated given in Table 8.

Perhaps the prevalence of this enriched academic environment might have helped children of private schools 'to be more field-independent. If government schools are also provided with physical facilities like those of the private ones and could create a similar climate, the children of government schools would also become more field-independent and can fare equally well in the learning tasks. With a great concern to attract children into field-independence, educational administrators should make serious and sincere efforts to provide the necessary congenial academic learning enviornment in all type of schools since the variable 'type of school' has emerged to be a greater determining factor for establishing better learning style among all the children.

TABLE 8

Differences in the Prevailing Situation in government and Private Schools

S. No	*Aspect of Difference*	*Government Schools*	*Private Schools*
1	Educational Investment	Inappropriate, insufficient and not meaningful	Quite appropriate, sufficient and meaningful
2	Infrastructure Facilties	Poor, fewer not attractive, not systematic	Rich, abundant, attractive, systematic well-furnished
3.	School Climate	Pseudo-academic, traditional, not lively, not pleasant, insecure feeling, dull, lack of enthusiasm	Fully academic, modern, novel, interesting, lively, naturally pleasant, full of enthusiasm
4.	Instructional Activities	Defective planning, directionless,inadequate, non-participatory, unnecessary fear, waste producing, demotivated, not joyful, avoidance	Well-planned, well-conceived, well-directed, well-conducted, activity-based, participatory, well organised, well-motivated, joyful acceptance
5	Role of Teachers	Qualified but not well trained, uninterested, otherwise motivated, lack of seriousness of profession, lack of self- respect, avoid responsibility, maintain distance with student, no confidence, frustrated, a sense of helplessness, non-contended, not motivated, no self-interest, lack of spirit of competition	Well qualified, dedicated, self interested, love for profession, self-respect, self-responsible, inspires students, ever helpful, personal touch, contented, highly motivated, spirit of competition
6.	Teacher Competency	Not so competent, traditional classroom practice, stereotype teaching, no experimentation or innovation, unscientific evaluation, not able to create healthy classroom climate, ineffective curriculum transation	Competent, well-planned classroom management, innovative teaching and classroom practices, experimentation, comprehensive evaluation, create healthy classroom, climate, effective curriculum transaction

S No.	Aspect of Difference	Government Schools	Private Schools
7	Curriculum	Unfamiliar, alien to the field of experience, not well received, not assimilated, lack of parental support in difficult areas, reluctant, not enjoyable, stress and strain	Relevant to needs and suitable to the abilities, properly transacted, well received, parental support in hard spots, enjoyable

Furthermore, recent inquiries have tended to highlight the individual teacher as the chief factor determining the progress of the children. The most obvious step for the teacher is to begin to break the vicious circle of low expectation giving rise to low avhievement by deliberately devising ways of increasing motivation. Therefore, the teachers should be adequately trained to identify the different learning styles functioning in children and to adopt, in turn appropriate teaching strategies that suit the individual learning style and cognitive ability of a child. This extra input on the part of the techer may include additional hours of individual attention bestowed upon the children If we allow the child to continue to be field-dependent it my lead to a negative consequence since too much of field dependence congnitive style may lead to learning disability after a long span of unnoticed time.

Therefore, it is with immense resonsibility that we should better our school conditions so that there is a uniform and proper envioronment facilitating and ensuring overall and uniform development of the child.

For making "construtive leaps" in education the cost factor should not become an impediment in any way. The society and the government should do thier best to marshal their commitment and resources for education and promote school effectiveness for which 'a radical and rational change' is essential. It would be apt to reiterate the statement of Maslow (1962): "Change requires a constant willingness to take chances, make mistakes and break habits." Let us all strive to carry out change in the prevailing ineffective conditions of government schools to realise a positive school effectiveness at least now onwards.

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Effectiveness of Cognitive Strategies in Developing Reading Skills Among Primary School Students

K. Chellamani S. Mohan

The study aimed at improving the reading skills of Class V students using cognitive strategies as an intervention. Reading skills comprise of components like phonological skills, morphological skills and cognitive skills. The study implied the use of cognitive strategies like guessing, resourcing, transfer, clarification and verification, deduction, etc., for improving reading comprehension of students.

Introduction

The author is always interested in sending her school children for competitive examinations. From the feed back on their performance, it was found that the students do find difficulty even in reading the question paper, since they lack in reading comprehension.

The World Health Organisation in 1997 highlighted the importance of mental health and propounded the following ten skills, namely—

1. Decision-making
2. Problem-solving
3. Creative thinking

4. Critical thinking
5. Effective communication
6. Interpersonal relationships
7. Self-awareness
8. Empathy
9. Coping with stress
10. Coping with emotion

In the above said skills language plays a very important role. The basic aim of teaching English, it is believed, to enable the student to develop skills of listening, speaking, reading and writing English.It is while speaking and writing that the problem of intelligibility and acceptability arises. Correctness based on internationally accepted standards cannot be ignored by us, for today the compulsions of learning English in India arise not only out of political reasons but also out of the need to enhance knowledge, especially in Science and Technology. The teachers of English language should, therefore, undertake the task of giving a sound knowledge of English to our students,keeping in mind a comprehensive view of the function of English today in India as well as in the world. A student must be equipped not only to get information and knowledge from books written in English but must also have the ability to use the language for intelligent discussion and communication. So the student must learn English in a way that the sentences he produces, both written and spoken, must be clearly understood and must be adequate for the context.

The lack of study skills training in our nation's schools is woefully obvious, whether the school is in the poorest section of town, or the richest, in the inner city or suburban, public or private, elementary junior or high school.

Today's mark-oriented examination and mark-based admission in the educational institutions require the reading habit in students. Looking into these factors, the researchers intended to draw awareness to the need of the hour, i.e. the importance of reading and its comprehension.

Here the investigators want to state what Reading is. It is the reader' reaction to graphic configurations, visual substance and then associating these visual symbols with meanings Reading is, what it consists of, and on what principles the writing system that they are faced with is constructed, they then need to exploit this knowledge to achieve a reading performance that becomes increasingly fluent and error-free and in which many of component skills involved become increasingly automatic.

Effective communication is possible through the development of reading skills. According to O' Malley, cognitive strategies help learning to be effective Hence, the authors wanted to develop reading skills among primary school students using cognitive strategies.

Objectives

The following are the objectives of the research investigation:

- to find out the present level of reading skill on the following reading comprehension components. phonological skill, morphological skill, cognitive skill and the speed of reading;
- to identify the strategies in order to develop reading comprehension;
- to apply the cognitive strategies that would facilitate acquisition of reading comprehension skills;
- to identify the effectiveness of the cognitive strategies in developing the reading comprehension of the students

Methodology

The investigators adopted the experimental method to study the effectiveness of applying cognitive strategies in reading comprehension among primary school children. Experimentation is considered to be the scientifically sophisticated research method It is defined as observation under controlled conditions. It studies observable changes that take place in order to establish a cause-and-effect relationship

Statement of the Problem

Acquisition of reading skills in the mother tongue or any second language is dependent on several factors, which may be classified as personal and environmental. The teachers of English in our schools today do very little to improve matters in respect of most of the factors. However, they are in a position to improve the classroom climate, at least as far as his/her own personality and method of teaching reading are concerned; can also exercise effective control over some of the personal factors, e g., the pupil's command of language and their knowledge of the grammatical forms of the language as well as the culture of the linguistic group, but they should know their pupils' level of mastery of the English vocabulary and its basic grammatical forms. At an advanced level, they should also have knowledge of their difficulties in understanding the cultural patterns of the English-speaking people of the world. At the primary stage, the first two factors, i.e., the pupils' command of vocabulary and knowledge of the grammatical devices used in the language for expression of meaning are, perhaps,of greater importance.So the investigators thought that it would be worthwhile to investigate into their relative importance in enhancing pupils' achievement in reading comprehension.

The modern times have triggered an unprecedented thirst for information. It is generally recognised that one of the main causes for the poor standard of our high school pupils is their lack of the reading habit Since increasing importance is given to the teaching of English as a library language in our country today, any attempt to make a study of the factors contributing to the development of reading skills as well as the difficulties experienced by our students in reading English at the primary school level would be of great value.

Significance of the Study

The net result of the present investigation on reading comprehension may help the teachers to make their subjects interesting to the students. Reading would become an assimilation of thought, more meaningful and purposeful.

Hence, students will understand questions to be answered, facts to be remembered, ideas to be grasped and they will get the

pleasure of following well-written content. Hence the teacher can enhance the level of reading comprehension among the students.

Scope of this Study

It has within the range the various aspects of comprehending the given lesson in the prescribed prose-text. At the same time, the focus of the topic is narrow enough to limit the attention to reading and comprehension. The study specifies the potentials of the teaching strategies and adopts them to make learning of the detailed prose-texts effective in terms of reading comprehension The following hypotheses were formulated in this study.

Hypotheses

1 There is significant mean difference between the pre-test and post-test scores on reading comprehension because of the application of cognitive strategies

2. There is significant mean difference between the pre-test and post-test scores on reading speed because of the application of cognitive strategies.

In order to test the above hypotheses, the following assumptions were made:

Assumptions of the Study

1. In general, the concept "Reading Comprehension" is not perceived in the right sense.
2. As the present system of education is mark-oriented, "Reading" is deteriorating.
3. It is possible to make students understand "Reading" in the right aspect, and also its value.
4. It is possible to train students in the use of cognitive strategies that facilitate learning.
5. It is assumed that there will be an effect on reading comprehension by the application of cognitive strategies.

Delimitations

The investigation happened to be in the month of February which is the fag end of the academic year in a school. This is the time when teachers are very serious about the completion of the syllabus Hence, the investigators planned their intensive course for a month.

Since the investigators expected complete attention from the experimental group, they selected a quiet room with a door. And they were successful As per the expert's view, anything can be grasped quickly, the investigators selected the morning hours for the reading sessions, and conducted tests in the afternoon

Every day students spared two hours, one for listening and reading participation and the other for the tests The afternoon sessions began with silent reading where the speed was also calculated As soon as they finished their writing tests, they were called for phonological tests

The investigators divided the components of reading skill into three heads, other than the calculation of reading speed. The phonological skill was assessed, again, under two heads: (1) Reading aloud, (2) Punctuation The students were directed to observe the teachers' pronunciation and try to imitate the same. Their pronunciation, stress, pause and intonation were graded. They were also given passages to punctuate

The morphological skill is mainly based on word recognition skill and hence tests were given under five headings, namely: (1) dictation, (2) conceptual meaning, (3) opposite meaning, (4) puzzle and (5) anagram. Through these the students understood the importance of a word's meanings and opposites

Sample

The investigator selected Class V students for the study. According to the investigator, the exposed reading comprehension skill helped them in boosting up their progress in high school education. The investigator selected only 27 students out of 40 in Class V who were really in need of reading comprehension. With this adequate sample size they implemented the design for research. As it was a small group they were able to give total concentration to the whole group.

Experimental Study

Experimentation is the name given to the type of educational research in which the investigator controls the factors to which a child or group of children is subjected during the period of enquiry and observes the resulting achievement. There are different patterns of experimental research based on the groups used as individual or single group, parallel or equated groups and rotational groups. In this study the investigators adopted the single-group, pre-test, treatment, post-test design.

Reading comprehension is assessed on three different components other than the calculation of reading speed The student's pronunciation, stress, pause and intonation were assessed in the pre-test and they were directed to observe the teacher.

They were again assessed in the post-test at the end of the training session. They were also given passages to punctuate.The morphological skill was tested mainly on word recognition skill and hence the pre-test and post-tests were given under five headings, namely. (1) dictation, (2) conceptual meaning, (3)opposite meaning, (4) puzzle, and (5) anagram. Through these the students understood a word's meaning and its opposites. Moreover, they realised the contextual meaning other than the dictionary meaning and they were also trained in the application of the cognitive strategies in both Morning and Evening programmes in the Experimental Study. The details of the everyday programme with the application of cognitive strategies are presented herewith.

Morning Session		
S.No.	*Programming*	*Application of Cognitive Strategies*
1.	Reading aloud	Guessing/Inductive
2	In-depth Integration	Resourcing
3	Utilisation of schema or Prior Knowledge	Transfer
4.	Interference and Facilitation	Clarification and Verification
5	Cognate Recognition	Deduction

Afternoon Session

S.No	Programming	Application of Cognitive Strategies
1	Silent Reading	Selective Attention
2.	Thinking Aloud	Recognition and Recall
3	Monitoring Process on.	
	i Phonological Skill	Auditory Key Words
	ii. Morphological Skill	Grouping
	iii Cognitive Skill	Transfer, Inferencing Recombination and Translation
	iv Speed Monitoring	Internalisation

Ultimately the investigator's target was to see whether the students comprehend the passage. To assess, the cognitive skill was divided into four headings, i e , (1)Literal Level, (2) Inferential level, (3) Correlative level, and (4) Evaluative level This helped them to think on any information and moreover they were forced to recall their previous experience or gained knowledge in order to correlate or evaluate.

Every subheading in the components was evaluated for a hundred marks and the consolidated percentage for each skill was taken into account. This was done for each test and for all the tests together. The corrected answer scripts were given to the students immediately in the very next session and hence the investigators gathered instant feedback. The difference between the pre-test and post-test was the yardstick for identifying effectiveness of cognitive strategies in reading comprehension.

With this adequate sample size the investigators implemented the design for research. As it was a small group she was able to give total concentration to the whole group.

Threats to Experimental Validity

Bradky and Bryant (1983) have shown that exercises in phoneme manipulation lead to improvements in children's reading. There have been many differing claims about the casual connections between various linguistic and cognitive deficits and dyslexia. Scribner and Cole (1981) found that familiarity with different scripts gave their users different cognitive advantages, like grammatical awareness and memory ability. These cognitive

advantages, however, could be desired from the social circumstances surrounding the learning of the script. Yet they were able to show that it was schooling that was the primary determiner of success in logic and reasoning tasks.

Experimental Validity

In educational experiments, a researcher has to face some impediments which are threats to external as well internal validity. In order to control such variables, one has to be cautious in one's experiment.

In any behavioral experiment, a number of factors that have been manipulated (independent variables) have a genuine effect on the observed consequences in the experimental setting — for example, maturation, selection bias, unstable instrumentation, testing, experimenter bias, etc. The experiment lasted for thirty days. So the question of maturation did not arise.

The time of the researcher's experiment was the fag end of the academic year. She selected Class V as they are going to enter High School. The investigator selected only 27 students out of 40, who were really in need of reading comprehension.

Unreliable instruments used to measure aspects of behaviour are threats to the validity of an experiment. In this study, actual performance of the students was evaluated. All the four skills under assessment, namely, phonological, morphological, cognitive and reading speed, were awarded scores The evaluation scale was carefully evolved. The students were evaluated for all the tests conducted. Evaluation was done on the same day and the feedback was given to the students the very next day. So the threat to internal validity was overcome.

Relevance of Experiment to Research Design

As reading involves knowing the language and its meanings, the investigator divided the components of reading skill into six headings directed towards phonology, morphology, syntax, comprehension, communicative proficiency and speed. After framing the specification for the above headings, the investigators found repetition, and, moreover, they expected clarity. The other factors they had taken into consideration are:

1. The reading test result should give information indicating the extent to which the teacher's instructional objectives in reading are being achieved.
2. The data obtained should be utilised in the improvement of the reading programme
3. The testing of reading should be an integral part of the regular testing programme within the school Hence the six headings were reduced to four

Reading with understanding expects the reader to pick up the tone of the writer. In accordance with pronunciation, stress, pause and intonation, they were assessed in the oral test and also through punctuation. The phonological skill test stands first in the components of reading skill The flair for language needs mastery over words. Hence to assess the morphological skill tests like word puzzles, multiple choice questions and dictation were included. The chief agent in reading is the mind· a great deal of prior knowledge is brought to efficient reading. It also amounts to cognitive skills

Th activities were devised to be as natural as possible, i.e., as close as possible to what one would naturally do with the text. Students were made active in the reading process by presenting them with decision-making activities or using the information in the passage to find a solution, make a decision or solve a problem. These were all graded under four headings, namely (1) Literal level, (2) Inferential level, (3) Correlative level, and (4) Evaluative level Improving reading at this level is a matter of developing speed without sacrificing comprehension. A silent reading session was provided on all the days to pick up speed and it was graded with a number of words per minute.

Construction And Validation of Tools

The evaluation of the components of reading skill was drawn for each individual. The chart was on four headings.

1 Phonological skill -was assessed on two main headings: (a) reading aloud, and (b) punctuation and both were summed up.

2. The morphological skill was divided into five components (a) dictation, (b) conceptual meaning, (c) opposite meaning, (d) puzzle and (e) anagram Each one was evaluated for 100 and they were summed up and converted into percentages.

3. The cognitive skill was assessed on four levels namely, (a) literal level, (b) inferential level, (c) correlative, and (d) evaluative level understanding. Reading speed was calculated in words per minute and each child was assessed for all the ten tests. After establishing the content validity of the tools, reliability was established by using KR 20 methods. The tools were found to be highly reliable($r > 0.8$). Hence the tools possessed validity and reliability

Scheme of Data Analysis

The researcher examined the skill of reading under four specified aspects. Yet the scoring of those were not uniform. There were certain factors which were to be keenly observed. As the selected reading materials for the experiments were of different types, the weightage given for testing was different from one component to the other The early part of the experiment carried light materials where phonology and morphology were given much importance. Passages with facts and information concentrated on the cognitive skill. Hence towards the end, in scoring, the researchers had managed to bring uniformity. All the odd scores were converted into percentages The researchers focussed their analysis on different angles. Each skill had subunits. They were all put together and were analysed component-wise for all the students. Descriptive, relational and differential statistical analyses were attempted

Descriptive Analysis

The distribution of the students' pre-test and post-test mean scores in percentages on the components of reading skill was as shown in Table 1

TABLE 1

Students' Mean Scores in the Pre-test and Post-test

Student Number	*Mean Pre-test*	*Mean Post-test*	*Post-test Reading Speed Words/Mt.*	*Reading Post-test*
01	37 77	42.50	110	197/lmt
02	47.35	53.10	135	147/lmt
03	35.00	54.00	145	200/lmt
04	35 00	37.50	135	115/lmt
05	44.00	55 66	180	243
06	33.00	62.50	185	194
07	33.00	62 00	250	160
08	39 00	56.00	200	170
09	63.10	75 40	200	310
10	54.00	52 00	160	176
11	17 40	17 50	170	253
12	53 00	5.60	250	278
13	39 00	60.00	250	256
14	66.00	83 60	262	240
15	77.00	79.50	250	213
16	64.00	79.00	125	192
17	54.00	70 00	194	198
18	31 00	35 00	154	198
19	40 00	58 00	184	149
20	47.00	60 00	230	238
21	17.00	41 00	122	217
22	57 00	72.00	172	165
23	50 00	62 50	131	166
24	26.00	37 50	141	182
25	53.00	54 00	141	198
26	61 00	57.00	190	187
27	57.00	57.00	204	268
Total	1230.62	1479.92	4870	5510
Mean	45 58	54 80	180 40	204.10

The above table describes the pre-test and post-test mean scores of all the students in reading comprehension and reading speed

Differential Analysis

In order to find out the significant difference between the pre-test and the post-test mean scores on reading comprehension, the 't'-test for correlative small groups was applied.

The obtained 't'-value of 2.38 is greater than the theoretical 't'-value of 2 0560, hence it is concluded that there is a significant mean difference between pre-test and post-test mean scores on reading comprehension Hence the null hypothesis is rejected

In order to find out the significant difference between the pre-test and the post-test mean scores on reading speed, the 't'-tests for correlative small groups were applied

The 't'-value was found to be 2 18, which is greater than the theoretical 't'-value of 2 056 Hence it is concluded that there is a significant mean difference between the pre-test and the post-test scores on reading speed

In addition to the application of parametric statistical techniques non-parametrical statistical technique was applied to test the significant difference between the pre-test and the post-test scores on Reading Comprehension and Reading Speed; the man Whitney U-Test was also applied and the same results were obtained which showed the significant mean difference between pre-test and post-test scores

Findings

1. There is no improvement in the phonological skill.
2. The improvement in morphological skill is from 53.86% to 72 06%
3. The positive comprehending capacity of the children is shown in the pretest-post-test scores variation from 45 58% to 54.80%
4. The reading speed is increased for all the children from 169 words per minute to 204 per minute.
5. There is significant mean difference between the pre-test and post-test scores on reading comprehension because of the application of cognitive strategies

6. There is significant mean difference between the pre-test and post-test scores on reading speed The number of words read in a minute is increased from 169 to 202 because of the application of cognitive strategies.

TABLE 2

Distribution of Students' Improvement in Various Skills of Reading Comprehension

S No.	*Phonological Skill*		*Morphological Skill*		*Cognitive Skill*		*Reading Speed Skill*	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
1	22 27	32 50	44.94	60 00	46 12	45 00	110	197
2	36.50	47 50	53 00	56 35	39 00	60.00	135	147
3	43 00	35.00	40.00	84 50	23 00	42 50	145	200
4	31 25	15 00	43.50	60.00	30 00	37 50	135	115
5	60 00	42.50	63 00	84.50	44 00	40 00	180	243
6	51 00	40 00	74.70	95.00	33 00	52.50	185	194
7	36 25	32.50	36.00	96.00	27 00	57 50	250	100
8	43 00	35 00	36 00	79 50	39 00	52 50	200	170
9	61 25	55.00	68.00	86.00	61.00	85 00	200	310
10	57.50	40.00	68 00	50 00	37 00	65 00	160	176
11	18.75	07.50	22 41	25.00	11 00	20 00	170	253
12	53 00	35 00	63.00	54.50	42 00	77 50	250	278
13	35.00	45.00	46.00	81.50	37 00	52 50	250	256
14	80 00	72.00	66 00	96 00	56.60	82 50	262	240
15	81.00	62.50	82.00	96.00	68.00	80 00	280	213
16	64 00	67 50	68.00	89.50	61.00	80 00	125	192
17	57.50	47.50	62 00	84.50	41.00	77.50	194	203
18	33 00	37 50	35.00	33 00	24 00	35.00	154	198
19	42.00	22 50	46.00	89.50	32 00	62 50	184	149
20	47 50	32 50	64 70	91.00	27 71	55.00	230	238
21	14.00	09.00	25.00	18 30	12.00	15.00	122	217
22	54.00	36.00	61.00	90 00	55 47	90.00	172	165
23	51.00	22 50	58 00	90.00	40.76	75.00	131	166
24	25.00	27 50	35 23	77.90	19 00	55.00	141	182
25	42.50	27.50	75.00	77 90	42.00	55.00	141	198
26	61 25	57.50	69 00	46.00	52.43	67 50	190	187
27	52.50	32.50	48 63	53 00	50 00	67 50	204	268
	1254 02	1017.00	1254.31	1945.65	1051.09	1585 00	4562	5455
	46 45%	37.69%	53.86%	72.06%	38.93%	58.70%	169	202

Note The above table explains every student's pre-test and post-test scores on all the skills concentrated.

Educational Implications

1 In order to develop phonological skill, instructional technologies can be used in the classroom. Using audio-visual aids will enhance proper pronunciation.

2 Class room teaching would be more effective if it has discussion, seminars and the like. More interactions with children will help them to make use of their previous experience and knowledge to understand the text well.

3 This in turn will help children infer and evaluate the material in hand.

4. Reading aloud will help cognitive appraisal which will result in proper comprehension in reading speed. Hence students should be oriented in reading aloud techniques.

Conclusion

The set pattern for reading comprehension fits into the process of thinking Since thinking plays a pivotal role in learning, it has to be nourished for reading comprehension Development of reading skills is not only for language but also for all other subjects. The teachers of today should realise the implications and they should be innovators by incorporating cognitive strategies,communicative tasks, and instructional design towards facilitating reading comprehension.

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SECTION VI

Developing Mathematical Skills

The studies discussed in this section include:

- Enhancement of Learning Achievement in Mathematics through Empowerment of Teacher Competence. An Experiment
- Intervention Strategies to Improve Cognitive Processes of Children in Finding Solutions to Addition and Subtraction Problems
- Effectiveness of Improvised Aids (Matchbox) in Teaching Mathematical Concepts at Primary Level (Class I)

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Enhancement of Learning Achievement in Mathematics through Empowerment of Teacher Competence: An Experiment

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A. K. Khatua

The objective of the study was to ascertain the effectiveness of Mastery Learning Strategy (MLS) in attaining of Minimum Levels of Learning (MLL) by Class II students in mathematics. The study was conducted on 315 students of Class II from both rural and urban areas. The students of the experimental group were taught by the MLS approach and the control group by the conventional teacher-centred approach. The study revealed that MLS was more effective as compared to the teacher-centred approach in enabling learners to attain mastery of competencies in mathematics.

Introduction

One of the major objectives of teaching primary school mathematics is to enable children to solve the numerical and spatial problems to the best of their capacity, speed and accuracy. These problems they encounter at home, in the school and in the community. Primary mathematics should help children develop understanding of key mathematical concepts at each level through appropriate experiences.

In our country the majority of the children may not have the opportunity to receive education beyond the primary stage. Hence,

what they acquire during primary education is all that they require to guide them throughout the life Calculations and computations are necessary for everyone in day-to-day life, whatever profession or life style one chooses.

The objectives of teaching mathematics can be achieved when these are defined in terms of observable behaviour of the learners The teacher has to decide what competencies the learner must possess as he/she passes out of each class The competencies are nothing but the minimum levels of learning in mathematics, without which primary education becomes incomplete.

It is essential to know the exact levels of attainment of learners in terms of specific competencies This would not only present a clear picture of the level of learning presently achieved by learners' education system *vis-a-vis* the MLL Dorasami, Bhat and Shailaja (1994) pointed out through their study that no school had achieved the expected levels of mastery and even for a single student to master 80 per cent of the competencies in mathematics was not that easy This showed that whatever be the kind of school attended, a student is likely to complete his/her primary education without mastering even 80 per cent of the competencies under MLL.

Research evidence shows that the achievement of learners differs widely according to varieties of school parameters, such as locale (urban and rural), government aided and unaided schools, CBSE affiliated and State affiliated schools, lack of infrastructural facilities, adequacy of time available for teaching, regularity in home assignments and their correction, different teaching techniques and teachers' competence, commitment and performance, and many other school climate indicators (Govinda and Varghese, 1991, Shailaja, 1992; Gupta, 1992; Ramkalyani, 1993; Sukla et al , 1994; Padhi, et al., 1997).

Another set of researchers put in efforts to compare specifically the effect of Mastery Learning Strategy (MLS) with the conventional approach to teaching mathematics and analysed the pupils' achievement. They reported that pupils taught through MLS achieved significantly higher on mathematics competencies as compared to conventional groups (Hooda, 1984, Dyarmett, 1991, Jangira and Yadav, 1994; Tripathy, 1995;

Mishra, 1998).

The situation discussed above leads to a few questions. Are we in need of different methodologies to teach in lower classes in Primary schools to enhance retention and thereby reduce wastage and stagnation? Are the teachers in want of study materials to adopt any learner-centred strategy, say Mastery Learning Strategy (MLS), instead of the conventional teacher-centred strategy to enhance school effectiveness?

To have some idea with regard to these questions this study was contemplated on MLS, by which the learning achievement through teacher empowerment could be judged.

Concept of MLS and the Corresponding Strategies Used in the Study

Mastery Learning is an effective set of individualised instructional practices which consistently help most students to learn excellently In this study the practices followed were of the group-based or teacher-paced variety where students learn cooperatively with their classmates and the teacher controls the delivery and flow of the instruction

In the process followed in this study, the teacher could help virtually most of the students to learn as much better as possible Under mastery learning it became possible to help most of the learners to acquire 80 to 90% of the content taught, through the use of appropriate materials and by increasing the time for learning for the pupils falling short of the desired level.

Bloom's (1971) approach represented a great advance over other strategies in two important respects. First, the feedback instruction, and second, its strategy, employ a greater variety of instructional correctives than other strategies. According to him the Mastery Learning Strategy entails the following:

(a) Division of materials to be learned with smaller units.

(b) Use of quality instructional strategies for each sub-unit

(c) Provision of periodical feedback of results with necessary corrective strategies.

(d) Provision of corrective feedback until the student achieves mastery of the learning unit.

(e) Scope for each student to receive appropriate amount of allocated quantity of instructional time and proportion of engaged learning time.

The MLS has certain variables which Bloom has emphasised should be used in a strategy for mastery learning All possible care was taken to deal with the variables like motivation for learning a particular type of task, equality of instruction, ability to understand instruction, perseverance and time allowed for learning to yield a better result in the present perspective in different school contexts in this study. The four basic steps such as defining mastery, planning for mastery, teaching for mastery and grading for mastery, based on tasks and sub-tasks suggested by Anderson and Block (1988), have been followed in the implementation of MLS in experimental schools

Objectives

The following objectives were formulated for the study:

- To design a mastery learning strategy (MLS) for attaining knowledge and skills required of selected competencies in mathematics for Class II.
- To enhance teaching competence among primary school teachers in using MLS.
- To study the effect of the MLS approach on the learning achievement of Class II learners in mathematics.
- To study the influence of MLS on attainment of selected competencies in mathematics in relation to the locale, caste and school context.

Hypotheses

Thus for the present study, the following hypotheses were formulated:

- The proportion or percentage of learners attaining mastery of the individual or overall competencies varies in relation to the locale, caste and school contexts

- Teacher competence in MLS influences achievement of learners.
- Training of teachers mastery learning strategy facilitate in theteaching competence in mathematics of primary school teachers.

Methodology

Design

In this study an attempt has been made to apply the MLS in monograde (large-sized and small-sized) and multigrade types of school. An experimental design was planned in two sets of schools, the control group where the traditional method was followed and the experimental schools where MLS was adopted

Sample

The multistage cluster sampling technique was adopted to draw the sample for the study. In the first stage, Bhubaneswar city in the district of Khurda and Mantri Panchayat in the district of Mayurbhanj were selected as urban and rural locales, respectively. From the urban locale, six monorgrade (four large-sized classes, two small-sized classes) and two multigrade schools were selected From rural area, six monograde (three each with large-sized classes and small-sized classes) and four multigrade schools were drawn. All the students (N=315) studying in Class II of these schools constituted the student sample. Of these students, 229 belonged to general castes and 86 to backward castes (SC/ST).

The selected schools representing different types of schools and locale assigned to experimental and control treatments are shown in Table1 The students studying in experimental schools and control schools constituted the experimental (N=199) and control (N=166) group respectively.

The detailed distribution of the sample schools, locale and context have been given in Table 1.

TABLE 1

Area-wise Distibution of Sample Schools, Teachers and Students

Types of School	*Locale*	*Category of Schools*			*No of Teachers*	*No of Students as per Caste*		*Total*
		LSS	SS	MG		GC	BC	
Experi- -mental	Urban	2	1	1	4	100	19	119
	Rural	1	1	2	4	45	35	80
Total		3	2	3	8	145	54	199
Control	Urban	2	1	1	4	52	05	57
	Rural	2	2	2	6	32	27	59
Total	4	3	3	10	84	32	116	
Grand Total		7	5	6	18	229	86	315

LS - Large Sized Class. SS - Small-Sized Class; MG - Multigrade GC - General Caste
BC Backward Caste (SC/ST)

Procedure and Collection of Data

The training materials on MLS on selected competencies were developed, reviewed and tried out in two different types of situations in urban and rural contexts.

In a two-phased workshop with the help of teacher educators the following materials in teaching mathematics for the use of teachers on MLS were developed:

- MLS based teaching-learning materials on content and selected competencies
- Materials on mastery learning strategy.

1. MLS-based Teaching-Learning Materials (TLM) on Content and Selected Competencies

The textbook prescribed by government of Orissa for Class II was not MLL based. The content which is meant to be taught in the second half of the academic session was selected and MLL competencies were framed in the light of the competencies framed at the national level and developed the TLM in two workshops.

The TLM consisted of the list of competencies, support materials on the content (of the solid objects such as cuboid, sphere and cylinders; geometrical figures such as rectangle, circle, triangle, straight line and curved line; exchange of currency; measures of length, weight and volume of liquid; time; use of calender; preliminary idea about division) required for transacting related activities, suggested test items for formative test, proposed time schedule for transaction of different contents, blueprint for criterion-referenced competency-based test, record sheets for formative and summative evaluation.

2. Materials on Mastery Learning Strategy (MLS)

The material on MLS was developed in the workshop. It included information on theory and practice of the strategy, classroom observation schedule to be used by classroom supervisors and a test on MLS for the teachers.

After finalisation of the materials the teachers of experimental schools were trained on MLS. Then the teachers transacted the contents and related competencies in their own schools using the strategy under regular supervision and feedback from the investigators from time to time, for three months.

During the experimentation the achievement of learners was measured through criterion-referenced tests. Necessary remediation was provided by the teachers to each individual learner through different activities, thus providing the learners with extra instructional time required for mastering the competencies. At the end of the programme the knowledge and skill of each individual was evaluated using summative test.

The teachers of controlled schools were not provided any treatment and were allowed to adopt the conventional teacher-centred approach. At the end of the programme the knowledge and skill obtained by the learners were also evaluated using the same summative test.

Steps followed in Mastery Learning Strategy in the Study—

- Selection of competencies to be developed.
- Selection and design of learning activities for original and remedial instruction.

- Use of learning activities keeping instructional time as a variable.
- Identification of masters and non-masters through formative testing.
- Remedial teaching for non-masters
- Retesting and reteaching to enable most of the learners to be masters.
- Engaging masters in enrichment activities and peer teaching.

Findings

In order to ascertain the mastery of competencies by students representing different levels of independent variable, a thorough analysis of mastery of the individual and overall competencies were made using the data obtained through formative tests.

The percentages of masters in individual and overall competencies in terms of locale, caste and school context are presented in Table 2.

A close observation of Table 2 reveals that after original instruction followed by remediation there was overall improvement in learning achievement of experimental groups. The total percentage of students attaining mastery after initial instruction (23.12%) has increased upto 82.41 per cent. The percentage of masters of individual competencies ranged from 86.43% to 96 98% and the significant percentage of masters ranged from 91 to 99%. The findings reveal that the MLS is effective in enabling learners to attain mastery.of competencies in mathematics.

Locale

It is evident from table that a significant percentage of students master the individual and overall competencies irrespective of the locale of the school. However, a significant difference is indicated in favour of students from rural background over the urban ones in respect of attaining mastery in few competencies such as measurements of weights by using standard measures, stating the names of day of the week sequentially, quickly and correctly and name of the day before and after a particular day, understanding the concept of division — half and quarter. It might be because of the learner's involvement in the parental

TABLE 2

Masters of Individual and Overall Competencies among Students of Experimental Schools in Different Context on Formative Test (N=199)

Total Sample			*Locale*			*Caste Category*			School Contexts					
Competency Number	Percentage of Masters	Significant Percentage of Masters	Urban Schools N = 119 Percentage of Masters	Rural Schools N = 80 Percentage of Masters	Z-value	GC N = 145 Percentage of Masters	Z-value	BC N = 54 Percentage of Masters	Large Class N = 90 Percentage of Masters	Small Class N = 30 Percentage of Masters	Multigrade N = 59 Percentage of Master	Z-value		
			(P_1)	(P_2)	(P_1-P_2)	(P_1)	(P_2)	(P_1-P_2)	(P_1)	(P_2)	(P_3)	(P_1-P_2)	(P_2-P_3)	(P_1-P_3)
1	91 96	96	91.60	92 50	0 23	90 34	96 30	1 37	88 89	96	93 22	1.44	0 63	0 89
2	91 96	96	89 92	95 00	1 29	91 03	94 44	0 79	84.44	98	98 31	2.49**	0 12	2.75*
3	93.47	97	91 60	96 25	0 23	91 72	98 15	1 63	93 33	100	88.14	1 87	2 52**	1 10
4	96.98	99	98 32	95 00	1 34	97 24	96 30	0 34	95 56	98	98.31	0 75	0 12	0 91
5	88.44	93	88 24	88.75	0 11	86 90	92 59	1 11	85 56	98	94 75	2 35**	2 39**	0.14
6	96.98	99	96 64	97 50	0 35	96 55	98 15	0 59	96 67	98	96 61	0.45	0.44	0 02
7	90 95	95	85.71	98 75	3.14*	88 97	96 30	1 60	82 22	98	98.31	2 74**	0 12	3 02*
8	90 95	95	88 24	95 00	1 63	99 97	96 30	1 60	84 44	94	98 31	1 66	1 19	2 75*
9	95 98	99	94.12	98 75	1 63	95 86	96 30	0.14	94 44	98	96 61	0 99	0 44	0 61
10	94.47	98	90.76	100.00	2 80*	93 10	98 15	1 39	91 11	96	98 31	1 08	0 73	1 80
11	83 41	91	80 67	95 00	2.89*	83 45	97 44	2 01**	74 44	98	94 92	3 54*	0 85	3 22*
12	86.93	92	78.99	98 75	4 06*	83 45	96 30	2 39**	73 33	100	96.61	4 01*	1 31	3 66
Overall > 9 Total > 95	82.41	88	74.79	93 75	3.44*	83 45	94 44	2.72	73 33	94	86 44	2 97	1 31	1 91

* Significant at 0.01 level

** Significant at 0.05 level

business of agricultural produce. Particularly in rural set up the children at the age of 7+ even join the parents in marketing the commodities produced at home. Such an experience might influence mastery of competencies. On the other hand the urban children are mostly dependent on the parents and they are usually supplied most of their requirements at their doorstep as per the capability of their parents.

Caste

It is clear from the table that a significant percentage of learners belonging to general caste and backward castes could master the individual and overall competencies. However, it was found that backward caste children were superior to general caste learners in the use of calender and understanding the concept of division — half and quarter. It might be due to the fact that most the children belonging to backward castes help their parents in day-to-day business by contributing daily labour in urban places and agricultural produce in the rural set-up.

School Context

A significant percentage of pupils studied in different school context could master most of the competencies. However, significantly higher percentages of learners belonging to small-sized classes performed better than their counterpart in large-sized class in at least five competencies, such as recognition of rectangular, circular and triangular figures, addition and subtraction of rupees with rupees and paise with paise, measurement of weight using standard measures, use of calender, understanding the concept of division and quarter and in overall competency.

Learners in small-sized classes were superior to their counterparts from the multigrade context in recognition and construction of straight and carved lines and addition and subtraction of rupees with rupees and paise with paise. This might be due to greater attention and feedback provided by the teacher in the class.

The attainment of mastery in the five competencies was better in multigrade context than in large-sized classes. Those competencies were recognition of rectangular, circular and triangular figures, measurement of weights by use of standard measure, measurement of volume of liquid by use of standard

measures, use of calender and understanding the concept of division — half and quarter.

This result again might be due to possibility of providing grater attention and feedback provided by teachers in a small-sized class.

Further, an attempt was made to examine the percentage of learners attaining mastery of MLL competencies at different levels of independent variables. For critical analysis of learning achievement scores in summative test obtained by learners of experimental and control groups the competencies were grouped under three areas, such as knowledge, skills and overall. The result was analysed with respect to variables like locale, caste and school context. The percentage of masters of individual and overall competencies were obtained. Obtaining a score of 80% and above on each area and overall was considered as mastery of the concerned area. The percentage of students attaining mastery in three areas of competencies, i.e., knowledge, skill and overall, are presented in Table 3.

TABLE 3

Comparison of Percentage of Masters in Different Areas in Experimental and Control Schools on Summative Test

Percentage of Masters	*Percentage of Masters in Knowledge Competency*			*Percentage of Masters in Skill Competency*			*Percentage of Masters in Overall Competency*		
	Experimental P_1	Control P_2	Z-value P_1-P_2	Experimental P_1	Control P_2	Z-value P_1-P_2	Exprimental	Control P_2	Z-value
Urban	84.03	1 75	10 33*	72.27	5.26	8 32*	66.39	0.00	8.29*
Rural	85.00	5.08	9.32*	86 25	6.78	9.27*	72.50	0 00	8.57*
General caste	82 07	3.57	11.47*	71.72	8.33	8 25*	62.76	0.00	9.35*
Backward caste	90.74	3.13	7.96*	94.44	0.00	8.62*	85.19	0.00	7.66*
Large Sized Class	84.44	0.00	9 33*	70.00	7 41	7 29*	65.56	0.00	7.74*
Small Sized Class	96.00	4.55	8.87*	86.00	6 82	7.66*	82.00	0.00	7.99*
Multigrade Context	74.58	11.11	4.81*	83.05	0.00	6.41*	62.71	0.00	4 66*
Total	84 42	2 01	14 17*	77 89	3.52	12.74*	68 84	0.00	11.89*

*Significant at 0 01 level

A perusal of Table 3 reveals that there was significant difference between the percentage of masters in all the three areas at 0.01 level between the experimental and control groups students. In control schools irrespective of locale, caste and school context no one could master the overall competencies. These students are normally promoted to Class III though they are not ready in terms of prerequisite knowledge and skills to be required to be successful.

Locale

Further, it is evident that greater percentage of rural students performed well in skill-based competencies as compared to urban ones in experimental schools. But in case of control schools there was no such occurrence

Caste

With regard to the caste context, in experimental schools it was found that a higher percentage of learners attained mastery of skill-based and overall competencies. In control schools very few learners could attain the mastery of all types of competencies; the possible reason of a significantly higher percentage of backward cast learners achieving mastery could be attributed to same social factors. The backward caste leaners are mostly from poor families and thereby they are exposed to skill-based competencies as compared to knowledge being associated with their parents. The learners belonging to the general caste are usually from rich or middle-class families where the learners' exposure to out-of-school activities is mostly in knowledge level. The children even have private tutors who give importance to knowledge-based competencies only.

School Context

With regard to the mono or multigrade context, it was revealed that in experimental schools small-sized classes provide a better condition to produce more masters as compared to large-sized classes and the multigrade context. In control schools the school context had no influence over students' learning achievement.

The findings conclusively reveal that the learning achievement of learner in experimental schools differed significantly at 0.01

level indicating their superiority over their counterparts in the control school perhaps because of the adoption of MLS.

Teacher Behaviour and its Effects

To analyse teacher behaviour and its effect on learning achievement their knowledge about the strategy was ascertained by administering a test. Their ability to adopt MLS in classroom conditions was recorded on a classroom observation schedule on a number of lessons. The mean rating for each teacher and mean student learning achievement of the class were calculated.

Teachers' achievement score on the achievement test on MLS and mean observation rating score of each teacher was correlated and it was found that the product moment coefficient of correlation was 0.763, establishing the positive relationship between the teachers' knowledge on MLS and their classroom behaviour.

Correlational analysis of scores of teachers' performance and students achievement of the basic of locals, i.e. urban and rural, is presented in Table 4.

TABLE 4

Correlation among TAMLS, TMOR and SMACH in Urban and Rural Schools

Locale	*TAMLS with TMOR*	*TAMLS with SMACH*	*TMOR with SMACH*
Urban	0.84	0.98	0.86
Rural	0.84	0.98	0.92

TAMLS - Teachers' Achievement in MLS

TMOR - Teachers' Mean Observation Rating Score

SMACH - Student Mean Achievement Score

A close look at the table shows that in both the context all the three variables, i.e., Teachers' awareness about MLS, teachers' competence in adopting MLS and students' mean achievement scores were significantly correlated.

The scores of the teachers of both type of schools were treated with 't'-test, which is presented in table 5.4

TABLE 5

't'-value between Experimental and Control Schools in Teachers' Knowledge and MLS

Types of School	*Mean of Knowledge on MLS*	*S.D*	*'t'*
Experimental	8 00	1 07	11 11*
Control	2 90	0 88	
Experimental (Rural)	7.50	0.58	1.41
Experimental (Urban)	8.50	1 29	
Control (Rural)	2 83	0.75	0 29
Control (Urban)	3 00	1 15	

* Significant at 0 01 level

A close look at the table shows that the knowledge about the MLS of teachers of both types of schools differs significantly. This proved that the teachers working in the control school were not aware sufficiently about the strategy. The non-significant nature of the scores between rural and urban teachers within experimental schools shows that teachers of both the groups were influenced almost equally by the use of TLM.

The forgoing analysis made it clear that the adoption of MLS resulted in better achievement in experimental schools.A significant percentage of learners could learn mathematics better as compared. to their counterparts in cotrol schools. The significant correlation among the variables—teachers' knowledge on MLS, teaching' competence and mean students' achievement in the class—and the relationship of teachers' knowledge on the strategy between the two types of schools lead to acceptance of the hypotheses

Educational Implications

MLS is proved to be an effective instructional strategy. It should be adequately stressed during the pre-service teacher education programme.

- Extensive in-service teacher training on MLS should be taken up to make the teachers aware about it.

- Teachers need to be provided with teacher's guide in the form of TLM in addition to textbooks
- Some exercises could be extended to rest of the content of mathematics and to other subjects.
- Norm-referenced testing should be replaced by criterion-referenced testing in primary schools.

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19

Intervention Strategies to Improve Cognitive Processes of Children in Finding Solutions to Addition and Subtraction Problems

A.D. Tewari

The aim of the study was to diagnose learning difficulties faced by Class II students in solving problems on addition with carrying and subtraction with borrowing and to suggest intervention strategies to improve upon the solution-processes of students in these problems.

A competency-based criterion-referenced achievement test was administered on a sample of 212 Class II students studying in eight rural primary schools. Fifty students were identified who could attempt only up to 40 per cent items correctly in five most difficult items each from addition with carrying and subtraction with borrowing. Equivalent forms of competency-based criterion-referenced achievement tests were administered on these students before and after they were given remedial intervention in the form of teacher-guided learning activities.

The findings of the study revealed that teacher-guided learning activities have helped in improving students' achievement.

Introduction

The business of mathematics education in school is an extremel complex enterprise, influenced by interaction of countles

learners, instructional and content variables. Studies that attempt to isolate individual factors for experimentation are routinely ignored by practitioners who judge them irrelevant amid the complexities of classrooms in action Thus while organising concepts in the area of teaching and learning of specific type of mathematical contents, teachers commonly group topics into fields such as arithmetic, algebra, geometry, calculus, etc. There has been research focussed on the special problems of teaching each of these curricular areas. However, topics in these separate fields often present similar structures as learning tasks, such as: performance of a routine skills; state or apply conditions for use of a mathematical term; probe principles relating operations; construction of solutions to non-routine problems, etc.

Resnick and Ford (1980) have observed that "school mathematics in every curricular area involves learning of skills, concepts, principles and problem-solving There have been major lines of research addressing the special conditions that influence each type of learning " The area of computational skills, i e., abilities to add, subtract, multiply and divide numbers have long been central goals of school mathematics instruction. Research on teaching and learning of mathematical skill has been concentrated on the skills of arithmetic, in which the studies can be devided roughly into those that deal with basic facts and those that deal with the computational algorithms by which basic facts are applied to more complex calculations Suydam and Dessart (1980) have analysed the research in these areas and found 'despite many studies, more important questions than useful results.' Fey (1982) observed that on the learning of facts, the basic questions seem to be:

(a) What are the relative difficulties of various specific facts and operations?

(b) What sequence and balance of role and meaningful instruction lead to best short-term or long-term learning?

(c) What practice of drill pattern leads to greatest retention, and what strategies do students naturally use to retain facts?

(d) How does the learning of facts for one operation enhance or interfere with that of the other operations?

Researches on these questions fall into roughly three periods of emphasis. For the first, the theory of arithmetic instruction was dominated by Thorndike's S-R approach to learning and research studies concentrated on determining which basic facts were most difficult and which patterns of drill and practice were most effective in fixing algorithmic behaviour The next phase was reflected in the landmark work of Brownell (1947) which shifted the focus of arithmetic research by suggesting that meaning and understanding are essential factors even in the learning of skills. This view, joined by Piagetian inspired interest in concrete bases for number learning, set the agenda for research on skills over past many years. The third major phase in arithmetic skill research lies largely in the future, as electronic calculators become available for performance in arithmetic. This new technological environment raises fundamental questions about what skills are still important and how the technology can be used to assist in skill teaching (Fey, 1982).

However, in the area of researches in elementary school mathematics education in India, the research seems revolving round the second phase which establishes that effective skill development can not be seperated from conceptual understanding and its use in problem-solving. In the present study an attempt has been made to see what practices and drill patterns lead to greater retention and what common classroom intervention strategies help students to retain facts naturally with the following specific objectives in mind:

Objectives

- to identify solution-processes used by children,
- to diagnose learning difficulties of children,
- to develop remedial intervention strategies to overcome the learning difficulties of children,
- to assess efficacy of teacher-guided learning activities as intervention strategy
- in solving problems related to addition with carrying and subtraction with borrowing in elementary mathematics.

The present study has been delimited to the sub-competencies as given below in the area of addition and subtraction of Class II mathematics delineated in an expert group meeting

Sub Area: Addition

1. Addition with carrying

   1.1 Two digits with single digit

   1.1.1 sum at unit place is zero

   1.1.2 sum at unit place is not zero

   1 2 Two digits with two digits

   1.2 1 sum at unit place is zero

   1 2.2 sum at unit place is not zero

   1 3 two two-digits with one single-digit

   1 3.1 sum at unit place zero

   1 3.2 sum at unit place not zero

   1.4 Three two-digits numbers

   1.4.1 sum at unit place zero

   1.4.2 sum at unit place not zero

Sub Area: Subtraction

2 Subtraction with borrowing

   2.1 Single digit from two digits

   2.1.1 minimend's unit place not zero

   2.1.2 minimend's unit place zero

   2.2 Two digits with two-digits

   2.2.1 minimends unit place not zero

   2.2.2 minimends unit place zero

   2.3 Difference in single digit

   2.3.1 unit place not zero

   2.3 2 unit place zero

Oral and figural computation skills related to these competencies have been excluded in view of intricacies of assessement. Further, the study has been restricted to Class II students studying in rural primary schools of a district under DPEP scheme.

Methodology

Design

The design of the study has been given in the following:

Tools

A paper-pencil type competency-based criterion-reference achievement test consisting of 28 items (addition 16 and subtraction 12) was developed in an expert group meeting after

Stage	Presage	Process	Product
Stage 1	1.1 Competency-based criterion-referenced achievement test	1.1 Administration and item-wise scoring of the achievement test	1.1. Identification of solution processes used 1.2. Identification of items/sub-competencies in which students were facing difficulties 1.3. Identification of students attempting wrongly the items/sub-competencies labled difficult
Stage 2	2.1. Responses of students on competency-based criterion reference achievement test	2.1 Analysis of mistakes of students in different problem situations and identification of ways to attempt those problems correctly	2.1. Development of teacher guided learning activities as remedial interventions
Stage 3	3.1. Equivalent forms of competency-based criterion-referenced achievement test on difficult sub-competencies	3.1. Administration of equivalent forms of achievement test on difficult sub-competencies on the identified group of students both pre and post-remedial intervention sessions	3.1. Assessment of efficacy of remedial intervention strategy

carefully analysing the sub-competencies of addition with carrying and subtraction with borrowing along with problem situations of row, column and day-to-day life situation sums excluding oral and figural sums In the test, students were directed to solve the question the way they wished in the given space provided with the question.

2. Two equivalant forms of competency-based criterion-reference achievement tests were developed on those five sub-competencies which were identified as most difficult in each of the addition with carrying and subtraction with borrowing. Each sub-competency was represented in the achievement test.

3 After careful analysis of the responses given by students in the competency-based criterion-referenced test, the following teacher-guided learning activities were identified:

For addition with carrying—

(a) Draw lines/figures, make bundles of five to add

(b) add first two addends, then add third one in the sum

(c) note/write the carry at the top

(d) write in terms of tens and ones then add

(e) convert the row sums/figures in problem sums into column sums and follow any of the (a) to (d).

For subtraction with borrowing—

(a) use lines/figures to find difference

(b) note the borrowing at the subtractor

(c) write in terms of tens and ones then find difference

(d) convert row/problem sums into column sums and follow any of the (a) to (c)

Sample and Collection of Data

The competency-based criterion-referenced test was administered to identify solution-processes used, items/sub-competencies most difficult and students with learning difficulties in these

difficult items, on a sample of 212 Class II students from eight rural primary schools selected from one district (Dhenkanal, Orissa) covered under the DPEP scheme after ensuring that these concepts have already been tought in the regular class by the teacher. This testing situation was designated as a diagnostic testing situation. In this administration, schools were selected randomly while all the students present in the class on the date of data collection were administered the test.

Item-wise scoring of response sheets of each student enabled to identify five items each in addition with carrying and subtraction with borrowing which were attempted wrong by the majority of the students. The item No., sub-competency involved, the problem situation and the percentage of students attempting it wrong in the order of their rank, both in addition with carrying and subtraction with borrowing, have been given in Table A and B.

TABLE A

Difficult Sub-Competencies in Order of Their Rank on Addition with Carrying

Sl No.	*Item No*	*Sub-Competency*	*Problem Situaion Wrong*	*% of Students Attempted*
1.	8	Addition of three two-digit numbers when the sum at unit place is not zero	Column sum	55.66
2.	6	Addition of two two-digit numbers with one single-digit number when the sum at unit place is not zero	Column sum	45.75
3.	16	Addition of three two-digit numbers when the sum at unit place is zero	Problem sum	44.81
4.	11	Addition of two two-digit numbers with one single-digit number when the sum at unit place zero	Row sum	42.92
5.	12	Addition of three two-digit numbers when the sum at unit place is not zero	Row sum	41.98

TABLE B

Difficult Sub-Competencies in Order of Their Rank on Subtraction with Borrowing

Sl. No	Item No.	Sub-Competency	Problem Situtaion	% of Students Attempted Wrong
1	4	Subtraction of two-digit number from two digit number when unit place of minimend has zero	Column sum	40 09
2	9	Subtraction of two digit number from two digit number when unit place of minimend has zero	Row sum	37.26
3.	6	Subtraction when difference is in single digit and unit place has zero	Column sum	35.38
4.	12	Subtraction when difference is in single digit and unit place has zero	Problem sum	32.55
5.	5	Subtraction of two-digit n umber from two-digit number when unit place of minimend has no zero	Column sum	31 60

After that, students who had attempted more than 60% items wrong of these five most difficult items in addition with carrying and subtraction with borrowing were identified. Keeping in view the intricacies of administration of remedial testing materials, only 50 students from three schools were retained for remedial intervention.

In each of the three schools, students identified with learning difficulties were categorised into two groups Group I included those students who had attempted more than 60% of difficult items wrong in addition with carrying. This group was administered equivalent form (form A) of achievement test on addition with carrying. Group II included those students who had attempted more then 60% of difficult items worng in subtraction with borrowing. This group was administered equivalent form (form A) of achievement test on subtraction with borrowing. After that, both the groups were given exposure

and practice under the supervision of the researcher in teacher guided-learning activities to solve difficult items from the respective area. The researcher also helped students to use these activities in simple ways to solve the specific problems given. Next day, the equivalent form (form B) of the achievement tests was administered in the respective groups. Both the equivalent forms of achievement tests were scored. A sample of 47 (26 for addition with carrying and 21 for subtraction with borrowing) was procured.

Statistical Techniques

Simple percentage analysis, 't'-test for significance of difference between correlated means following the difference method and significance of difference between correlated percentages were applied for analysis of data and interpretation of results.

Findings

1. The majority of the students have used cognitive process of mental computation followed by process of converting the row sums and problem sums into vertical forms and few students have used figures/lines to find out answers to the problems both on addition with carrying and subtraction with borrowing as can be seen in the following Table 1.

TABLE I

Cognitive Processes Used by Students in Solving Difficult Items on Addition with Carrying and Subtraction with Borrowing

Sub Area	*Item No.*	*Cognitive Processes Used*		
		Mental	*Figural*	*Vertical Representation*
Addition with Carrying	6	94	5	–
	8	110	5	–
	11	80	–	9
	12	63	–	25
	16	52	–	50
Subtraction with Borrowing	4	78	5	–
	5	62	5	–
	6	77	3	–
	9	72	1	9
	12	27	1	67

2 There was statistically significant gain in achievement scores of students on five difficult items on addition with carrying. The gains, between pre-intervention and post-intervention testing as well as diagnostic testing and post-intervention testing, were significant at .01 level and between diagnostic testing and pre-intervention testing was significant at .05 level (reference Table 2).

TABLE 2

Significance of Gain in Achievement of Students on Difficult Items on Addition with Carrying During Diagnostic Testing, Pre-Intervention Testing and Post-Intervention Testing

Values	*Difference in Scores on Five Difficult Items on Addition with Carrying*		
	D_{12}	D_{23}	D_{13}
Sample size	26	26	26
M_D	0 88	1.77	2 65
SD_D	2.01	2 67	2.97
'T'-value	t_{12}=2.26*	t_{23}= 3.40**	t_{13}=4.57**

* Significant at 05 level

** Significant at .01 level

It can clearly be seen from the Table 2 that maturation has contributed significantly, though at .05 level of significance; remedical intervention has contributed significantly, at .01 level of significance; and maturation coupled with remedial intervention has contributed significantly at .01 level of significance to the mean achievement of students in difficult sub-competencies on addition with carrying. (The term 'maturation' (refers to the enrichment acquired in the competency by the student in school or otherwise during the intervening period.)

3. There was statistically significant gain at .01 level in achievement scores of students on five difficult items on subtraction with borrowing between all the three testing situations, i e , diagnostic testing, pre-intervention testing and post-intervention testing (reference Table 3).

TABLE 3

Significance of Gain in Achievement of Students on Difficult Items on Subtraction with Borrowing During Diagnostic Testing, Pre-Intervention Testing and Post-Intervention Testing

Values	*Difference in Scores on Five Difficult Items on Subtraction with Borrowing*		*D_{12}*
	D_{23}	D_{13}	
Sample size	21	21	21
M_D	1.67	2.14	3.81
SD_D	2.52	2.97	4.11
't'-value	t_{12}=3.03**	t_{23}= 3.29**	t_{13}=4.25**

** Significant at .01 level

It can clearly be seen from the Table 3 that maturation, remedial intervention and maturation coupled with remedial intervention have significantly contributed in the mean achievement scores of students with in difficult sub-competencies on subtraction with borrowing. (The term 'maturation' refers to the enrichment acquired in the competency by the student in school or otherwise during the intervening period.)

4 The difference between percentage of students attempting difficult items on addition with carrying correct during diagnostic, pre-intervention and post-intervention testing along with the corresponding 't'-values for significance of difference given in Table 4 are self-explanatory.

It is clear from the values given in Table 5 and Figure 2 above that maturation alone has improved significantly the proportions in case of items nos. 9 and 6 at .05 and .01 levels, respectively, whereas remedial intervention has significantly improved the proportions in case of items 9 and 12 at .05 level and items 4 and 5 at .01 level. In case of items 6, it has not improved significantly. Maturation and remedial intervention together have significantly improved the proportion in all the five items on subtraction with borrowing at .01 level of significance

TABLE 4

Significance of Difference Between Correlated Percentages of Students Attempting Difficult Items of Addition with Carrying Correct During Diagnostic Testing, Pre-Intervention Testing and Post-Intervention Testing (N-26)

Sl. No.	*Sub-Competency/ Item No.*	*Percentage of Students Attempting Correct*			*Significance of Difference Between Correlated Percentages*		
		Diagnostic Testing (1)	Pre-Intervention Testing (2)	Post-Intervention Testing (3)	t_{12}	t_{23}	t_{13}
1	I/6	19.23	42.31	69.23	2 11*	1.87	3 36**
2.	II/8	15.38	30 77	84.61	1 20	3.59**	4.37**
3.	III/11	30.77	38 46	69.23	0 66	2 26*	2 47*
4.	IV/12	38 46	50.00	69.23	0 94	1.28	2 08*
5	V/16	23 08	46 16	92 31	1 72	3.54**	4 27**

* Significant at 05 level

** Significant at 01 level

The corresponding bar diagrams have also been given for better comprehension in Figure 1

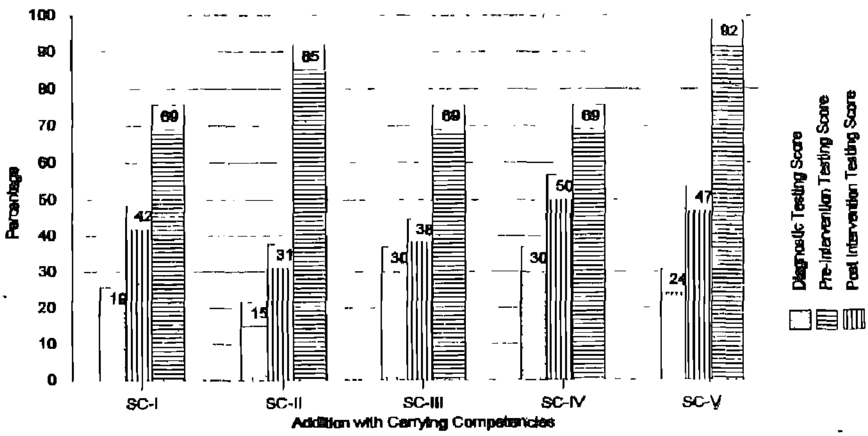

Fig. 1. Bar Diagrams Representing Percentage of Students Attempting Correct the Items Identified on Addition with Carrying during Diagnostic Testing, Pre-Intervention and Post-Intervention Testing

It is clear from the values given in Table 4 and Figure 1 that maturation alone has not improved significantly the proportion except in case of item no. 6, where it has improved significantly at .05 level. Whereas remedial intervention has improved significantly the proportions in item no 11 at .05 level and item Nos 8 and 16 at .01 level, maturation and intervention together have significantly improved the proposition in all the five items on addition with carrying viz., in case of items 11 and 12 at .05 level and items 6,8 and 16 at .01 level.

5. The difference between percentages of students attempting difficult items on subtraction with borrowing correct during diagnostic, pre-intervention and post-intervention testing along with the corresponding 't'-values for significance of difference given in Table 5 are self-explanatory.

TABLE 5

Significance of Difference Between Percentages of Students Attempting Difficult Items of Subtraction with Borrowing Correct During Diagnostic Testing, Pre-Intervention Testing and Post-Intervention Testing (N=21)

No.	*Compet-ency/ Item No.*	*Percentage of Students Attempting Correct*			*Significance of Difference Between Percentages*		
		Diagnostic Testing (1)	Pre-Inter-vention Testing (2)	Post-Inter-vention Testing (3)	t_{12}	t_{23}	t_{13}
1	I/4	4.76	23.81	85.71	2 00	3.61**	4.13**
2.	II/5	14 29	42.86	95.24	1.94	3.30**	4.13**
3.	III/6	14.29	61.90	85.71	3.18**	1 52	3.89**
4.	IV/9	0.00	38 10	85.71	2 84*	2.84*	4.26*
5.	V/12	23.81	52.38	85.71	1.94	2.31*	3.35**

* Significant at .05 level
** Significant at .01 level

The corresponding bar diagrams have also been given for better comprehension in Figure 2.

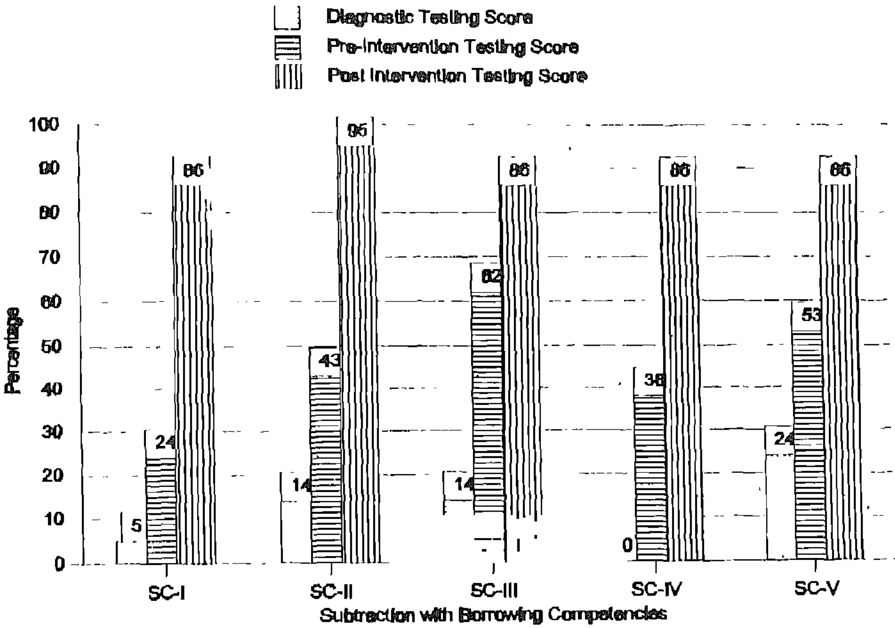

Fig. 2 : Bar Diagram Representing Percentage of Students Attempting Difficult Items on Subtraction with Borrowing Correct during Diagnostic Testing, Pre-Intervention and Post-Intervention Testing

6. Scruitiny of the equivalent forms of the achievement test administered both before and after the intervention revealed that students have utilised the techniques learned during remedial intervention in the form of teacher-guided learning activities in finding the solutions to most of the problems on addition with carrying and subtraction and with borrowing However, few students have used these in solving few problems during pre-intervention testing also.

7. Teacher-guided learning activities as a remedial intervention strategy has helped in achieving mastery (80% or more marks) to about 69% students in addition with carrying and to 86% students in subtraction with borrowing However maturation has helped 27% and 29% students in attaining mastery in addition with carrying and subtraction with borrowing, respectively. These figures have been given distinctly in Table 6.

TABLE 6

Number and Percentage of Students Attaining Mastery in Competencies on Addition with Carrying and Subtraction with Borrowing During Pre-Intervention and Post-Intervention.

Competency	*Diagnostic Testing*	*Pre-Intervention Testing*	*Post Intervention Testing*
Addition with Carrying (N=26)	-	07 (27%)	18 (69%)
Subtraction with borrowing (N=21)	-	06 (29%)	18 (86%)

Implication of Findings

The child reconstructs acquired knowledge continuously in familiar situations in various ways. But this alone cannot lead to mastery in case of every competency. That is why enrichment of acquired knowledge of the concept in various ways in classes and in other activities has no doubt brought improvement but significant improvement in very few 30% sub-competencies. To further improve upon acquisition of the competency to the level of mastery, suitable interventions are required. If these interventions are designed in such a way that learner's prerequisites are properly taken care of, these can further improve the acquisition of competencies. Teacher-guided learning activities derived and designed from the learner's solution-processes as intervention strategies have brought significant improvement in acquisition of a (70%) of sub-competencies. Since in a process of education, purposeful remedial interventions cannot be seperated from enrichment of acquired knowledge continuously in familiar situations in various ways (maturity), both these put together have significantly improved the solution processes of children to achieve mastery in almost all difficult sub-competencies.

On the basis of the findings of the study it can be concluded that appropriate remedial intervention strategies such as teacher-guided learning activities in lower classes help in bringing improvement in the cognitive processes of children to the extent of attaining mastery over the competencies in a specific subject area. While deciding about appropriateness of various

intervention strategies it must be remembered that children actively construct knowledge for themselves through interaction with the environment and reorganisation of their own mental constructs. Referring to the research on addition and subtraction, Romberg and Carpenter (1986) too suggest that "the current primary mathematics curriculum fails to capitalise on rich informal mathematics that children bring to instruction. Children's invented strategies for solving addition and subtraction problems are frequently more efficient and more conceptually based than the mechanical procedures, included in many mathematics programmes".

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20

Effectiveness of Improvised Aids (Match Box) in Teaching Mathematical Concepts at Primary Level (Class I)

S. Shivakumar

The objectives of the study were to develop improvised teaching aids with locally available materials and to ascertain their effectiveness in facilitating learning of mathematical concepts among Class I students. The study followed the experimental-control group design where the control group was taught through traditional methods and the experimental group by using improvised aids The pre and post-test conducted on these students indicated that students' achievement increased significantly by the use of improvised aids.

Introduction

Mathematics is a subject which deals with abstract concepts The abstract nature of the subject may lead to misconceived notions regarding mathematics. Concretisation of the abstract mathematical principles will make the learning of the mathematics easier, better and long-lasting This concretisation can the achieved through using aids. At the same time, provision of expensive and sophisticated aids is impossible for obvious reasons. Hence it is necessary to develop, implement and validate the effectiveness of improvised teaching aids on teaching mathematical concepts. The effectiveness of the mathematical kit could be measured through the application of the psycho-pedagogical skills among the learners

In the majority of schools the teaching of mathematics is carried out with the help of talk, chalk, and blackboard. Teaching should allow the children to learn mathematics through the hands — through experiences Children should be made to learn mathematics in an environment in which they are encouraged to manipulate physical objects.

Many abstract concepts in mathematics which teachers feel are difficult to teach to students, could be comprehended with the improvised teaching aids. Basic concepts, if concretised through the models and visuals, would enrich the experiences of the students for profound creative thought

Before each aid is introduced in the classroom some sort of activity is needed. This could be in the form of cutting strips of paper, collection of seeds or beads or grouping of children It is necessary to explain the concepts to the students and also give reinforcement

Hence the investigator decided to make a modest attempt to prepare improvised teaching aids with locally available resources and to attempt to identify their effectiveness on taching mathematical concepts among the first standard children at primary level.

Need and Significance of the Study

Nearly 75 per cent of the schools in India are in villages These schools do not have enough funds to procure equipments. Improvised aids made with simple materials available in the immediate school environment and the use of the local technology is perhaps essential to make learning relevant and effective. It is imperative that teachers should know to prepare, use and evaluate, improvised teaching aids so that their classroom interaction becomes more relevant and effective. By considering the above need and its importance, the investigator felt that this present study may be a more suitable one at present.

Scope of the Study

1. The present study will be very useful for both teachers and students in developing creativity and skill in learning

mathematical concepts by utilising improvised teaching aids.

2. Mathematical concepts learned through improvised teaching aids may be retained by the children in long-term memory.
3 The scope of the study is also extended to increase the insight of mathematics teachers to teach mathematical concepts in a simple and practical way.
4. Moreover, using improvised aids may reduce the unnecessary expenses in purchasing sophisticated equipments
5. Above all, learning through improvised aids may also encourage group work, team spirit and develop constructive attitude among children at primary level.

Delimitation of the Study

1 The study is meant for first standard children in municipal primary schools (model school for DIET).
2. The present study is restricted to the selected concepts in maths at primary stage (i.e., Class I)

Statement of the Problem

Mathematics is a subject which deals with abstract concepts. The abstract nature of this subject baffles the students Hence the necessity arises to concretise the abstract concepts so that learning mathematics will not pose a problem to the learners This concretisation can be done by using aids At the same time, the teacher has to make it in mind that provision of costly sophisticated aids is impossible. So he/she should be resourceful enough to make use of improvised materials as aids to cope up with the current needs. Moreover the teacher has to develop the improvised aids based on some standardised and established models (like the Unesco model) to make the teaching-learning process effective Hence the investigator developed an improvised mathematical kit and found out the extent of its effectiveness.

Objectives of the Study

- To design and develop improvised aids to teach mathematical concepts at primary level (Class I).

- To ascertain the effectiveness of improvised aids in facilitating student learning of mathematical concepts

Hypotheses of the Study

The following hypotheses were formulated by the investigator.

1. There is significant mean difference between pre-test and post-test scores of the experimental group of children.
2. There is significant mean difference between the experimental group and control group in the post-test.

Developing and Designing Improvised Aids

In the present situation, most of the primary schools are not provided with adequate facilities to teach mathematical concepts and the teachers are simply using the traditional method of teaching to teach mathematical concepts. Further, there is lack of adequate funds to purchase aids to promote mathematics teaching In this aspect, it is the task of every primary school teacher to teach mathematical concepts by utilising locally available resources to develop curiosity and mental ability among children.

Improvisation means to make and provide something quickly with materials which are available in the local area. The instructional materials in mathematics may be prepared by the available materials in a particular locality.

The need for improvisation is not only on the ground of economy but also on a number of significant educational issues Some of needs for the improvisation are explained below.

1. Mathematics being an abstract subject calls for psycho-pedagogical skills like identifying, comparing, sequencing, comprehension, assimilation, rehearsing retrieval, reasoning and inferencing. The above skills can be easily acquired by the students when the mathematics is learnt with help of improvised aids.
2. The idea also implies the channelising of the creative and constructive instinct. Pupils are also helped to acquire sound mental health.

3. Another outcome of improvisation is that it provides worthwhile education to pupils. It keeps them engaged in maths activities during their leisure hours.

Values of Improvisation

1. It helps in hand and head coordination.
2. The creative instincts of children are satisfied, the joy of creating the things themselves give them thrill and sense of satisfaction Children can aspire further to explore new things by themselves
3. It can provide a useful creative source of hobbies.
4. It develops scientific thinking and independence of thought.

The main emphasis on developing low-cost teaching aids, including home made apparatus, is to use simplest and the cheapest of the materials available in the environment of the children to the maximum level of learning activity. In a way these sort of improvisations contribute a great deal in making the school self-sufficient.

Educational and Psychological Values in Education

While preparing the improvised mathematical kit, the following characteristics of improvised aids were taken into account:

1 The raw materials were easily available either in free or at low cost in the local environment

2. The materials do not involve specialised skills and would be made by pupils,teachers or members of the community.

3. The materials were easily and effectively used by the teachers and pupils in clarifying the set objectives

4. The process involved in the production of materials was simple and inexpensive.

5. The material was simple, accurate and appropriate to the age level of the users.

The Process of Designing Developing, Producting and Evaluation of the Improvised Aids (as Prescribed by UNESCO)

Step 1: Identifying the need (nature of need, source of need, cultural background)

Step 2: Specifying target group (cultural background, level of education, age and area).

Step 3: Objective (knowledge, skills, attitudes).

Step 4: Identifying skills, procedures, techniques for realising objectives (feasibility, suitability, appropriateness, type of materials).

Step 5. Specifying approaches to design (creating new material, modifying, improvising exemplar materials)

Step 6: Considering raw materials and tools needed (availability in local area, cost).

Step 7: Producing prototype (relevance to curricula needs)

Step 8: Modifying of the try-out model (cost, time, feedback).

Step 9: Modifying of the try-out model (objectives achieved, effectiveness).

Step 10: Finalisation of aids.

The above mentioned UNESCO model was redesigned subject to the local condition A revised version of the research implementation process is provided herewith

Research Process

The Phases Involved in the Research Design

1. Meeting the primary school teacher
2. Selection of school for experimental study.
3. Identifying parallel groups.
4. Preparation of pre-test questionnaire.
5. Discussion with experts and modification of the pre-test questionnaire
6. Conducting the pre-test

7. Identifying and comparing the performance of parallel groups.
8. Selection of the mathematical concepts.
9. Collection of the waste and lowcost materials.
10. Preparation of improvised teaching aids.
11. Planning for instructional process.
12. Utilisation of improved teaching aids in teaching
13. Developing mathematical concepts
14. Preparation of the post-test questionnaire.
15. Discussion with experts and modification of post-test questionnaire.
16. Conducting the post-test.
17. Comparing the performance of the pre-test and post-test.
18. Finding out the effectiveness of improvised teaching aids in the experimental group.

The investigator used the experimental method for the present study. In the current investigation, the primary aim of the investigator was to study the effectiveness of improvised aids on teaching mathematical concepts at primary level (Class I). The study had two groups, namely, control and experimental. The control group was taught the selected mathematical concepts through traditional methods, whereas the experimental group was taught the same mathematical concepts by making use of the improvised aids. The groups were selected from the students studying in the municipal primary school

The difference in scores stands as a tangible proof of the impact of the improved teaching method using the improvised aids.

With this background the work-schedule given at page 326 depicting content areas, learning competency, statistical/ symbolic description/types of aids used/mathematical operation were designed before applying this model of approach in the classroom. In order to concretise the concept, a mathematical kit was prepared with the aids that are specified and utilised in the classroom, with the sequence of presentation from simple to complex.

Pedagogical Model for Using Improvised Teaching Aids/ Improvised Mathematical Kit

Content Areas (Learning Tasks)	Learning Competency Attained	Statistical/ Symbolic Description	Type of Aid Used	Mathematical Operation
To understand whole numbers and numerals	i. Counting 1-9 ii Understanding Zero Concept iii Learning numbers iv Demonstrating place value v. Understanding place value vi Matching the Numeric (greater, lesser, equal) understanding vii Ascending and Descending order of numbers viii Understanding the concept of "Before Number" "After Number" and "Between Number"	1-9 0 0-9 10-19 1-99 1-100 <,>, =	Concrete Board1 Concrete Board Concrete Board 2 Dual Box Abacus Tens Boxes Sign Boax Number Boxes Colour Strips Number Boxes Colour Strips	Identifying Comparing Sequencing Comprehension Assimilation rehearsing Comparing Comprehending Retrieval Association, Reasoning, Comparing and inferencing Comprehending, sequencing, Assimilation Concept formation correlation of Concepts
Whole numbers addition, Subtraction	Using symbols Single-digit addition Single-digit subtraction	+ - =	Number Boxes Colour Strips	Corephending Rehearing Interpreting Generating Reconstructing
To understand shape and spatial relationships	i Identifies the shapes ii Recognises the names of shapes as square, rectangle, triangle		Activity - playboard Number Boxes	Comprehending Reconstruction Rehearsal Recapitulation I Inucting Application Inferencing

Data Collection

A pre-test was conducted to identify the general performance of the group. The mean scores of pre-test of the two groups were tabulated and compared. The control group was taught by the traditional method and the experimental group was taught through improvised aids.

Improvised Mathematical Kit (First Standard)

Name of the Aid	*No.*	*Colour*	*Size*	*Uses*
Concrete Board - I	1 10 45	Red Colour Board Blue Colour Match Buttons or Seeds	34 cm x 24 cm	Understand Numerals 0-9
Concrete Board - II	1 10 45	Red colour Rose colour Matchboxes or Buttons or Seeds	34 cm x 24 cm 34 cm x 24 cm	Ascending order 0-9
Abacus Cardboard	1 1 99 9	Blue Colour Strip (indicates 10 place) Yellow colour Strip (indicates unit place) Yellown colour Strip (indicates unit place) Buttons Red colour boxes	30 cm x 5 cm 30 cm x 5 cm	Counting 1- 99 and understanding place value, addition, substraction
Dual Box Large-size matchbox, inner box divided into two parts) Numbered 10 to 19 Tens Box (Red colour box - each contains 10 buttons, Yellow colour box each contains according to the number)	10 145 10 10 145	Pink colour Buttons Red colour Yellow colour Buttons—and colour	12 cm x 6 cm Locally available	Place Value understand numbers 10-19 counting from 1 to 100
Numbered Matchboxes (numbered - 100)	10 10 10 10 10 10 10 10 10 10 10 10 10	(covered with match boxes) Light blue, Dark blue, Green, Light Yellow,Light Blue, Violet, Pink, Black, Dark Yellow, Red	Locally Available	Counting 1- 100 Addition, Greater than, Leser than, Same, Before After, Between, Whole Number, Numerals and Zero Concepts
Coloured Strips (10)	1 1 1 1 1 1 1 1 1 1 1	Light Blue, Dark Blue, Green, Light, Yellow, White, Violet, Pink, Black, Dark Yellow, Red	Each Strip 35 cm x 5 cm	Base of the number boxes Ascending/ Ascending/ Descending/ order purposes

Name of the Aid	Number	Colour	Size	Uses
Sign Boxes *			Locally available	Using and identification of symbols
+	1	Yellow colour		
−	1	"		
=	1	"		
<	1	"		
>	1	"		
Activity - Playboard (Board divided into two halves, each half divided into 50 equal parts)	1	Pink	24X35 cm	Children arrange the matchboxes in the master board in-different shapes like Square, Rectangle, Triangle, Ascending/ Descending order

Note. Total preparation cost of this kit is Rs.30 only

Data Analysis

The purpose of this study is to identify the effectiveness of improvised teaching aids at the primary level. The significance of the tests was used to test the research hypotheses in this study. In computing the 't'-value, the investigator has used mean and standard deviation.

Since the total number of children for this study is more than 30, the investigator has used the following formula.

$$t = \frac{M1 - M2}{S1^2/N1 + S2^2/N2}$$

TABLE

Descriptive analysis Distribution of Pre-test and Post-test Scores in Control and Experimental Groups

Sl. No. Control	*Pre-Test Scores*	*Post-Test Scores*	*Sl.No. Experimental Group*	*Pre Test Scores*	*Post-Test Scores*
1.	40	52	1.	44	64
2.	56	40	2.	52	60
3.	32	44	3.	48	56
4.	60	56	4.	48	60
5.	44	40	5.	44	68
6.	36	40	6.	44	80

Sl No. Control	Pre-Test Scores	Post-Test Scores	Sl.No. Experimental Group	Pre Test Scores	Post-Test Scores
7	48	44	7	40	60
8.	56	60	8.	40	62
9.	52	58	9.	52	68
10.	56	60	10.	52	64
11.	40	32	11	44	56
12	40	44	12.	48	52
13.	28	32	13.	36	60
14.	44	48	14	64	68
15	32	40	15	32	48
16.	40	52	16.	44	68
17.	60	48	17.	48	68
18	64	56	18.	60	54
19	48	52	19	44	60
20	64	56	20	48	76
21	48	56	21.	48	72
22.	52	56	22.	64	84
23.	52	56	23.	32	52
24	58	62	24.	40	64
25.	40	44	25	36	52
26.	52	56	26	52	68
27	48	56	27	48	72
28.	40	56	28	40	86
29	36	32	29.	36	32
30.	48	44	30	48	52
31.	48	80	31	48	72
32.	64	52	32	64	60
33	60	48	33	60	40
34	76	56	34.	76	64

Hypothesis 1

There is significant mean difference between pre-test and post-test scores of the experimental group of children.

Distribution of the 't'-Score Between the Mean Scores of the Pre-test and Post-test in the Experimental Group

Test	N	M	SD	Calculated 't'-value	Table Value	Remark 5% level
Pre-test	34	46.53	7.22	9.127	2.00	Significant
Post-test	34	64 82	9.19			

Since the calculated 't'-value of 9.127 is more than the table value at 5% level, there is significant difference between the mean score of the pre-test and post-test of the experimental group This research hypothesis is accepted

Hypothesis 2

There is significant mean difference between the experimental group and control group on the post-test.

Distribution of the 't' Scores between Experimental and Control Group in the Post-test

Test	N	M	SD	Calculated 't'-value	Table Value	Remark 5%
Control	34	50.47	8.96	2.96	2.00	Significant
Experimental	34	64.82	9.19			

Since the calculated 't'-value of 2.96 is more than the table value at 5% level, there is significant difference between the mean scores of the pre-test and post-test of the experimental group. This research hypothesis is accepted

Findings

1. There is significant difference between the mean scores of the pre-test and post-test of the experimental group. The test performance of the primary children in the post-test is higher than in the pre-test It is because of the effectiveness of improvised aids.
2. There is significant difference between the means of the experimental and control group in the post-test The improvised teaching aids were used for teaching mathematical concepts till the post-test stage for the experimental group. Hence the difference in the test performance of control and experimental group might have arisen in the study.

Implications of the Study

In DPEP districts, every primary teacher is given Rs 500 towards expenses connected with teaching-learning materials. But many teachers find it difficult to prepare materials of their own and

they often tend to purchase ready-made materials from shops The mathematical kit used in this present study will be of immense use to the primary teachers in their day-to-day teaching-learning process.

During in-service training programmes special training may be given to teachers in the form of workshops, to prepare the mathematical kit used for the present study.

Conclusion

The investigator has come to conclusion that this method of teaching (experimental group) the number concept using the improvised aids will be an effective one because it is child-centered, activity-based teaching-learning process. Further, the children enjoy the classroom atmosphere.

This mathematical kit, which costs around Rs.30 for primary school teachers to make, enhances the level of achievement in mathematics.

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SECTION VII

Catering to Children with Special Needs

The studies discussed in this section include:

- The Effectiveness of Dohsa-hou (*A Japanese Psycho-rehabilitative Programme in Body Consciousness of School Children*)
- Effective School Improvement Projects. Two Case Studies from the Netherlands
- Awareness of Classroom Learning Processes of Normal Elementary and Special High School Students with Mental Retardation in Mathematics and Japanese Language
- Enhancement of Learning Achievement in Mathematics of Handicapped Children through Activity-Based Teaching

21

The Effectiveness of Dohsa-Hou
(A Japanese Psycho-rehabilitative Programme in Body Consciousness of School Children)

Asghar Dadkha

The study was designed to introduce Dohsa-hou, a Japanese Psycho-rehabilitative Programme and to examine the body consciousness in disabled school children with changes affected by Dohsa-hou. The study was conducted on seven boys (aged 8 to 14 years) who belonged to a special elementary school in Iran and had moderate cerebral palsy. The Persian version of "The Body Consciousness Questionnaire" developed by Miller, Murphy and Buss (1981) was administered to these children in a pre-post design.

The study concluded that the conscious awareness of cerebral palsied children was increased significantly as a result of Dohsa-hou therapy and training. The study also revealed that children with cerebral palsy were found more conscious about the private aspects of their bodies than about the public aspects. The higher mean score on private body-consciousness after the training suggested that Dohsa-hou provided an opportunity to increase motor ability, confidence and independence among cerebral palsied children.

Introduction

The tendency of a person to direct attention inward or outwar(
is a component of self-consciousness. "Self-consciousness is th

experience of self-focused attention, associated with negative cognition and emotions regarding one's self or the evaluation of the self by others" (Buss, 1981) Individuals differ widely in attending to the private and public aspects of their body consciousness. These two dispositions, 'private and public self-consciousness', are measured by the Self-consciousness Scale (Fenigstein, Scheier and Buss, 1975).

A general distinction is made between the private aspects of the body from the public aspects "Private body-consciousness identifies attention that is focused on the internal aspects of one's body but public body-consciousness refers to attention being focused on external aspects" (Miller, Murphy and Buss, 1981). The satisfaction a person has with his body will depend upon the relative importance the person places on each of these aspects of his body-consciousness (Kelson, Cooke and Lansky, 1990).

Dohsa-hou, a Japanese psychological rehabilitation method which focusses on the improvement of the motor difficulties of cerebral palsied children, has been studied by Naruse (1967) who gave a new viewpoint to the disabilities of motor action in cerebral palsy children. His programme recognised that although the disabilities in cerebral palsy are based in physiological dysfunction, psychological activities are influential too.

Ono (1983) and Konno (1978, 1993a, 1993b) applied Dohsa-hou to autistic and hyperactive children, inducing personal interaction and eye contact with others. Kamohara (1980) and Tsuru (1982, 1985) applied Dohsa-hou to schizophrenic patients and found that their consciousness improved and their body posture changed Harizuka (1988, 1992) applied the method to cerebral palsy children, effectively teaching the importance of subjects keeping their sitting-posture by themselves. Dadkhah (1996) applied Dohsa-hou to disabled sportsmen, which sharpened public aspects of their body-consciousness so they improved their sports performances. In sports in Japan, from the Olympics in Rome to that in Tokyo, some Dohsa-hou techniques such as relaxation, mental rehearsal, and mental training have been introduced by Naruse (1975) to elite athletes to strengthen their game. The method has been practised on different kinds of disability and its efficacy has been established

in general. Recently, it has been widely used in special schools all over Japan.

The aims of the present study were (a) to introduce the Japanese Psycho-rehabilitative program of Dohsa-hou, and (b) to examine the body consciousness in some school children with changes affected by Dohsa-hou.

Introduction to Dohsa-hou

'Dohsa' means a holistic process of motor action which consists of the inner psychic activities of a body movement and 'Hou' means method. When we intend to move some parts of our body, we strive to carry out an intended movement. If the striving is appropriate to the movement, the intended movement can be carried out (Naruse, 1973) The method of Dohsa-hou is based upon such a concept

The process of Dohsa can be divided into psychological (intention and striving) and physiological (body movement). It is schematised as a process of "intention-striving-body movement" (Naruse, 1973). The accumulation of Dohsa training has been done one-to-one (trainee and trainer) In the situation of Dohsa-hou, a client is asked by the therapist to perform a pattern of body movements as an imposed motor task by the therapist. The basic tasks in Dohsa training are: (1) relaxation, (2) movement of arms, hands, and legs, (3) Tate-training. Relaxation is practised with different techniques in related postures (sitting, standing, walking), the basic movement of arms, hands, and legs is also practised, and the main training proceeds in Tate-training. Tate means making straight or putting in one line in vertical position. In the case of training it means making the positions vertical by making sure that the different parts of body are straight, vertical, and firm against the ground.

The aim of training is supporting the child to strengthen his body in the vertical position with respect to the floor and to help him take an erect posture when sitting, standing on knees, and standing on feet. In a Dohsa training session, the range of training varies from lying to walking. A child who is not able to stand and walk is trained in the sequence of sitting, standing on knees, standing on feet, and walking. These clinical experiences opened

a new way to the study of 'Dohsa therapy' which is a kind of non-verbal psycho-therapy mainly using Dohsa-hou. A verbal tool is used only for supplementary help (Naruse, 1985, 1992).

Body consciousness affected by Dohsa-hou

By applying Dohsa-training to some school children, the body consciousness was examined with changes affected by Dohsa-hou

Method

Subjects

Seven boys (ages 8 to 14; M. 10 6 yr., SD 2.43 yr) who belonged to a special elementary school in Iran (M education = Grade 3 3) and had a diagnosis of cerebral palsy (severity of handicap = moderate) were studied. These children had problems in motor action. Their common physical problems were those of standing balance, "incomplete" walking, and poor coordination of hands and legs during walking and running. The Japanese psycho-rehabilitation method (Dohsa-hou) was applied to these group of Iranian children in Iran.

Measurement

The Body Consciousness Questionnaire, developed by Miller, Murphy, and Buss (1981), was used following an adaptation into Persian (Farsi). Since the present research was not intended to measure body competence, items belonging to this factor in the original questionnaire were omitted. For the purpose of adaptation, the original questionnaire was translated into Persian language by the language experts. These translated equivalent was submitted to 10 bilingual experts to examine maintenance of the purpose, goal, and concept of the original questionnaire. Special attention was paid to psychological meaningfulness and wording of the each item. Then the questionnaire was back-translated into English. An identical procedure was followed to assess the back-translated equivalent. The Pearson correlation between original and back translation was .73. For test-retest reliability, the translated equivalent was administered to 25 subjects with a retesting interval of 3 weeks. The reliability was

estimated by Pearson r of .64. Then a group of 50 subjects was administered the questionnaire counterbalanced in order for their judgment. The Pearson correlation between scores the Persian and the original English versions was significant (.89.) Participants' responses, taken on a 5-point rating scale, were then scored and tabulated to create a 11 X 11 intercorrelation matrix which was then treated with principal component factor analysis and rotated with varimax method. The minimum loading of .60 was accepted for the items to be retained in the factorial structure. The analysis yielded two orthogonal factors, as in the original questionnaire, private and public body consciousness. Body competence factor was not considered. On Items 2 and 10, cultural group differences were observed; however, for the sake of the present experiment, such an issue was avoided and discussed elsewhere in terms of cross-cultural validity of the questionnaire (Dadkhah, 1997).

The adapted version of the questionnaire had 11 items altogether (Private = 5 items, Public = 6 items, as in the original) with response alternatives anchored by 1 (extremely uncharacteristic) and 5 (extremely characteristic).

Procedure

The Persian version of the Body Consciousness Questionnaire was administered to the cerebral palsied children (for the judgment to be recorded by the help of their mothers) in a pre-post-test design, i.e., before and after the Dohsa-hou training. There was no time limit set for this purpose. Children were required to give their answers for each item on a 5-point scale.

In the special school, with the cooperation of the school's authorities, a suitable room was chosen. The training procedure, goal and effectiveness of the method was explained to parents, children, and school authorities by showing examples using a VCR. Mothers accompanied their children during the training for further instructions to carry out at home. The training procedure was given five times a week, for three hours each time, and in total the training took one month on 8 1-hr. sessions of training for each child. The training procedure followed the manual of Dohsa-hou (Naruse, 1967, 1985). The focus was on

the desire — (1) to move or relax the subjects' body voluntarily, (2) to increase the awareness of moving or relaxing by themselves, and (3) to help them to convert the extension/flexion pattern of their postural deviation to a correct pattern The principles for the training tasks focussed on relaxation of body (especially the rigid parts), gait, standing on the knees, and walking, all naturally imposed

Results

Ratings (see Table 1) were analysed with a 2 (Condition: pre-post test) × 2 (Consciousness· private, public) mixed factorial design The main effect of condition was significant ($F1,12 = 14.17$, $p <<.003$), and body consciousness score was significantly higher at post-test ($M = 3.0$) than at pre-test ($M = 2.2$), suggesting some improvement following training The main effect of consciousness was also significant ($F10,120 = 6\ 73$, $p <<.001$) The mean score on Private Body Consciousness was significantly higher ($M = 2.8$) than that on Public Body Consciousness ($M = 2.5$). The interaction of condition × consciousness was not significant.

TABLE 1

Means Rating and SDs for Body Consciousness at Pre-and Post-test by Item (N=7)

Condition

Private Body Consciousness

1 In spite of having disability, I have confidence.
2. I am sensitive to my internal bodily tensions
3. I know immediately when my mouth or throat gets dry
4 I am aware of changes in my body temperature
5. I am aware of stiffness in my body

Public Body Consciousness

6. I am aware of my best and worst facial features
7 I am sensitive to my external bodily tensions.
8 I think about my body build 3 0 0 8 3.3 0.8
9 I am concerned about my bodily posture.
10. I like to show that I am strong on my feet.
11 I think I am capable to move quickly.

To see the improvement in body consciousness factors, with the same data, a one-way analysis of variance was done. The findings were a significant main effect between pre-test and post-test on Private Body Consciousness ($F1,12 = 11.44$, $p << .001$). On Public Body Consciousness, there was a significant mean difference between two conditions ($F1,12 = 8.13$, $p << 05$) These results suggest that the improvement in scores on Private body consciousness was higher than those on Public Body Consciousness.

Discussion

The present finding of a significant main effect for condition suggests that Dohsa-hou, the Japanese psycho-rehabilitative training method, had a positive influence on the body consciousness of this small group of cerebral palsied children. The index of consciousness was significantly higher after an one-month or 8-sessions (56 hours altogether) training programme. The main effect of body consciousness also was significant and the mean score on Private Body Consciousness was significantly higher than Public Body Consciousness both before and after the training. It suggests that children with cerebral palsy are more conscious about the private aspects of their bodies than about the public aspect. As one of the most important goals of the training, therapy, and education of disabled people is increased independence and confidence to promote integration into life activities (Letto, Bedrosian and Skarakis-Doyle, 1994), cerebral palsied children with physical disabilities often face the challenge of developing skills of mobility to gain greater access. In their communication, they become more conscious about their own ability and independence.

The interaction of condition x consciousness was non-significant. This finding suggests that the Dohsa training did not alter the direction of their consciousness, internal (private) or external (public), although the conscious awareness was increased significantly. The higher mean score on Private Body Consciousness after the training suggests that Dohsa-hou provides an opportunity to increase motor ability, confidence and independence. During training the subject's consciousness and effort produce the desired change in the motor activity (Naruse, 1985, 1992). The increased conscious awareness, as

observed in the present study, is therefore not unlikely However, it would be premature to draw a definite conclusion since few studies have been conducted. Further, the kind of disabilities these palsied children showed meant the observed changes were highly individual. These achievement helps the teachers to solve the problem of hard-to-teach children, low level of achievement and lack of infrastructure. These kind of programmes have been anchored to bring about qualitative improvement in school education at primary stage.

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22

Effective School Improvement Projects: Two Case Studies from the Netherlands

Bert P.M. Creemers   Rob de Jong

In this paper two projects in average schools and in schools with a high proportion of at-risk pupils are described. The projects, aimed to implement adaptive instruction, were successful not only in creating positive conditions for adaptive instruction but also in relation to pupil achievement in basic subjects in grade 3 (pupils six years old). The goals, methods and results of the projects are described. The explanation for success are discussed. Targets setting, an integrated curriculum approach, monitoring, evaluation (class consultation) and reinforcement (by school counsellors) are believed to be key components for success.

Introduction

In the Netherlands about 5% of the pupils between 4 and 12 years old are presently instructed in special education schools. In most Western European countries much lower percentages are found. The official policy of the Dutch government aims to decrease the number of pupils moving from primary to special education Schools in primary education should be more able to handle pupils with learning problems. In order to achieve this goal two general measures are taken (Meijer, 1996).

In the organisational structure the cooperation between special and primary schools is fostered, e.g., by creating a cooperating

structure and by creating another financial system making it attractive for primary schools to participate.

Secondly, the education in primary schools has to be changed in order to prevent that pupils are sent to special schools Schools and teachers should be able to create forms of instruction in which the achievement of pupils with learning problems is fostered. This paper is linked to this second kind of improvement.

In our country, we believe teachers cannot improve themselves in the isolation of the classroom. Forms of external consultation are built into the educational system in order to assist teachers with problems related to handling learning problems. In the Netherlands more than 40 Institutes exist for School Counselling They give training and guidance to principals, teachers and pupils (testing, diagnosing learning problems) in primary education They normally don't use a top-down strategy of improvement but try to match problems of schools with their own expertise. In the past we have seen a long history of failing improvements especially with regard to pupils-at-risk. In the beginning of the nineties some projects have started which tried to learn from the past and which are considered as 'effective projects'. In this paper we will describe two of these projects in order to find out what are the effective characteristics of school improvement in primary education.

First, the general characteristics of the projects will be described Thereafter the details of the projects will be presented. At last we will discuss the major determinants for effectiveness of improvement.

Objectives

The projects are directed at basic subjects. The core theme is 'learning to read' and 'arithmetic/mathematics'. The improvement is directed at the school as a whole but time and energy is spent especially at Class III (pupil 6 or 7 years old). In statistics about the achievement of pupils in primary education across grades, variance in achievement is rising in higher grades. This can be looked at as a normal trend caused by differences in intelligence and context situation between pupils (i.e., social economic status). This trend is also known as the 'Matthew-effect'.

"For unto every one that hath shall be given, and he shall have abundance; but from him that hath not shall be taken away even that which he hath" (Walberg and Tsai, 1983).

From an equity perspective this hypothesis is not very satisfying The main reason for the trend is considered the lack of adaptability of education to pupil needs. Some pupils need more time and are more dependent on the teacher (clear instruction) in order to achieve the common goals of the curriculum (Carroll, 1963) The treatment of pupils-at-risk is called 'adaptive instruction'. This form of instruction is not a one-dimensional concept The implementation of adaptive instruction in the USA shows much diversity (Wang and Walberg, 1985). There are a couple of characteristics most programmes have in common (Wang and Lindvall, 1984; Talmage, 1985; Houtveen et al , 1996).

- A form of teacher-directed instruction
- Monitoring of pupil achievement and subsequent feedback.
- Independent learning is fostered if possible.
- The learner is involved in the planning and management of the teaching-learning process
- The teacher needs to have expert knowledge of the subject.

Both projects are based on the idea that schools are only effective if they contribute to the above-mentioned effective characteristics in the classroom (Creemers, 1994). The classroom is the most important level to which all improvement efforts should be linked. The projects have a different pupil population. In the first project, average Dutch schools are used. In the second project, most pupils are from a cultural minority group.

The National Project Improvement (LPS-Project)

Objectives

This project is directed at stimulating the initial reading of pupils by means of adaptive instruction (grade 3 in Netherlands). The main research question was whether

implementation of adaptive instruction leads to improvement of pupil's results for decoding

For this aim teachers and principals were trained during three years by school counsellors. These counsellors were following a school improvement plan intended to create conditions at the schools for the implementation of 'adaptive instruction'.The concept of adaptive instruction consisted of 4 general targets:

- Learning time (instruction and time-on-task)
- The Direct Instruction Model
- The Phonics instruction method for initial reading (a new method)
- Diagnostic teaching (regular testing, consequences for the class and extra instruction for weak pupils).

Methodology

Participants

The project was directed at average primary schools. The experimental group in the project consisted of 12 schools; 11 additional schools were selected for the control group (total amount of pupils: 456) The experimental and control group schools were selected on the basis of comparable group size (>10 pupils), innovation experience (no fusion with other schools) and percentage of low SES pupils (<33.3%)

The experimental schools were assisted by eight counsellors from five different institutions. A project board was monitoring the improvement process. Members consisted of counsellors, staff developers from a National Pedagogical Center and researchers of two Universities.

Procedure

The first two years (1991-1993) were intended to create positive conditions for adaptive instruction. After two years the gain in implementation of adaptive instruction was assessed. The third year (1994) was the experimental year in which the testing of pupils took place. The improvement process was monitored by a project board every three months.

Measures

The counsellors had to meet three requirements: address all the topics in the contract with the school (seven themes related to adaptive instruction), guide all levels at the school (the principal, the team, the teacher of Grade 3), a time-investment of 80 hours during the three years and Class III consultations each year.

The implementation of the activities to be performed at the schools was assessed by means of logs school counsellors had to fill in during the three years. School counsellors had to fill in how much time was spent at the different type of activities and themes.

The implementation in the classroom was measured in different ways—

- instruction time, time-on-task and direct instruction was assessed by observers twice a year.
- using the phonics construction method was measured by means of logs
- diagnostic teaching was measured with a questionnaire.

Pupil achievement was measured at the end of the school year. A decoding test was used as post-test. This test was developed by the National Institute of Educational Testing (CITO) as part of a series of tests intended to measure (monitor) learning achievement and learning problems. The advantage of using these tests is that data are available about the average achievement of Dutch pupils for each grade. The '3-minute decoding test' measures for each of three cards (differing in complexity from one syllable words to words of four syllables) the amount of words the pupil reads out impeccably within the set time.

In order to know which part of pupil achievement was attributed to the treatment, pupil background and initial achievement had to be controlled. In the project the following pupil characteristics were used as covariates: IQ, SES, reading pleasure and an auditive synthesis (pre) test.

Design

In school effectiveness research the use of repeated measurement is considered important to assess the stability of effects. The

project uses a pre- and post-test design with a control group; one school year after the project was finished the achievement of the experimental group was measured again and compared with the national average.

Analysis

Differences in implementation between groups on the elements of adaptive instructions were analysed with 't'-tests. Differences between experimental and control group controlled for co-variates were analysed with co-variance analyses

Findings

School Improvement

All the counsellors of the 12 experimental schools had performed the minimal requirements. They spent at least 80 hours at the schools, performed three class consultations a year and drew attention to the 3 target groups and themes of improvement. In this sense the counsellors performed the minimal requirements set. Looking at the logbook data it was remarkable how differently the counsellors operated in the schools. The differences are related to the total time spent at the schools, the time directed to the 7 themes in the improvement plan, the distribution of time between the principal, team and the teacher of Class 3 and the amount of class consultations On an average, 135 hours are spent at the schools for counselling during the three year duration of the project. The minimum is 81 hours and the maximum 261 hours. The intensity of counselling can be considered higher when time is spent on individual discussions with the teacher of Class 3 and on class consultations (because in grade 3 the implementation and achievement is measured). The total average time spent on the individual teacher is 16 hours. On this variable we see again a large difference between counsellors (min.8 hours; max. 73 hours) Class consultations are sometimes not very frequent (n=4) but some teachers are visited often by counsellors (n=21 in three years). Although there was general agreement about the minimal requirements, the data about time-investment show different strategies used by counsellors. Not that the time spent as such did have an impact on implementation. The approach used by the counsellors was important. Class

consultation related to the implementation of (a combination of) setting goals, signaling problems and direct instruction (Houtveen and Jong, in preparation). The relation was quite strong in the 12 schools (r=71; p>01).

Implementation of Adaptive instruction

The implementation of adaptive instruction in the classroom was successful (statistical significant differences (5% level) between the experimental and control group) in relation to the following factors measured between 1992 and the 1994 growth in time-on-task (not in instruction time,) the extent to which the direct instruction is applied, growth in working with the principles of the phonics construction method, growth on 8 out of 9 variables of diagnostic teaching. The conclusion is that the experimental group consists of teachers who have significantly higher gain scores for several elements of adaptive instruction than the teachers of the control group

Effects

Pupils from the experimental group scored 12 points higher on the Three-Minutes- Reading-Test than pupils from the control group (a difference of a quarter of a standard deviation). The control group scored a fraction above the national average for this test. After controlling for the (4) co-variables in a co-variance analysis the difference between the experimental and control group was 16 3 at the test (31% of the SD).

One year later a post-test was administered again in the experimental group. Most schools of the control group were not willing to participate. Therefore, the test results of the experimental group (pupils now in Grade 4) were compared with the national average of pupils in Grade 4, controlled for SES and ethnicity. The results of the experimental group were about the same as the national average. A year before the difference was almost 22 points (28%) above the national average. The researchers conclude that the experimental effect disappears when the experimental treatment (specific goals, external support, monitoring of the behaviour of both counsellors and teachers) is not continued.

Small Scale Experiment at Risk Pupils (KEA-Project)

Objectives

The KEA-project is an improvement project of the Institute for School Counselling (CED) in Rotterdam. In 1990, the city of Rotterdam decided to start a project intended to show that it is possible to improve the achievements of pupils in schools with a high rate of ethnic minorities, by means of intensive guidance. The project was started in 1991 and will last for nine years.

The aim of the project is raising the achievement level of primary schools (with a high percentage of low SES pupils) to the national average. The subjects are native (Dutch) language (written and oral) and arithmetic/mathematics.

The following research questions were formulated:

1. Does teacher behaviour change in the intended direction?
2. Does pupil achievement improve as a result of the changes at the class level?

Quality enhancement is primarily directed at the classroom (Creemers, 1994) The key points are :

- instruction (direct instruction; improving curricula)
- learning time (improving time-on-task)
- class management (class context, rules, prevention of problems, general didactic skills)
- adaptive instruction (early signalling of learning problems, reteaching, intern guidance, remedial teaching), manuals are developed

The KEA-project lasts nine years. Effects are measured at regular intervals in order to see what happens with the achievement of the experimental group (when the pupils grow older). The project is not ended yet. In the first report, the results of the KEA-cohort (in Grades 3,4 and 5) are described In 1999, another report will be published about the KEA-cohort when the children are in Grades 5,6,7.

Method

Participants

The KEA-project started in 1991/1992 with four primary schools (three schools were added in 1996). These schools are selected because they have mainly at-risk pupils (from ethnically minority groups).

Procedure

The teacher instructing the KEA-group is trained and guided intensively. In table 1 the design of the trained teachers per grade is outlined.

TABLE 1

The Training of Teachers during the 9 Years in Relation to the Experimental Group (KEA) and the Grade in Which the Teacher Instructs the Year after the Training. (After KEA-1)

School Year	*KEA-exp*	*Trained teachers*	*After KEA-1*
1991-1992	Grade 1	Teacher 1(T1)	T1(92-93)
1992-1993	Grade 2	Teacher 2(T2)	T2(93-94)
1993-1994	Grade 3	Teacher 3(T3)	T3(94-95)
1994-1995	Grade 4	Teacher 4(T4)	T4(95-96)
1995-1996	Grade 5	Teacher 5(T5)	T5(96-97)
1996-1997	Grade 6	Teacher 6(T6)	T6(97-98)
1997-1998	Grade 7	Teacher 7(T7)	T7(98-99)
1998-1999	Grade 8	Teacher 8(T8)	T8(99-20)
1999-2000	SE-1		

The KEA-experimental group is instructed each year by a different teacher who is guided intensively. The next year the guided teacher instructs the same grade. He is guided one year and this may have an affect on the next year (after KEA-1).

The continuation of the results is largely in the hands of the school (teachers, principal, internal counsellor)

The guidance consists of :

- 30 class consultations each year at each school
- advising teachers in charge of remedial teaching

- meetings with teachers and internal counsellors about textbooks and new developments
- discussing the results of tests and the consequences
- training of intern counsellors in performing class consultations and test analysis

Data about the implementation of the work of the counsellors is not available.

Measures

The implementation was observed by counsellors who rated the instruction and management on a Likert scale.

In the KEA-Project, six tests were used for reading and two for arithmetic. The tests were developed by the National Institute for Education Testing (CITO)

In order to know which part of pupil achievement is attributed to the treatment, pupil background and initial achievement have to be controlled.

Social Economic Status (SES), home language and pre-tests (also used as post-tests) were used as co-variates.

Analysis

The data are analysed with multivariate variance analysis with educational level of parents and home language as co-variables; cohort and school are the group factors.

Design

The pupils from the schools are divided into three groups:

- pupils at school before the treatment started (4 cohorts 'before KEA') (n=420)
- pupils at school in Grade 3 in the school year of 1991/1992 who received the treatment (1 cohort) (n=150)
- pupils at school in Grade 3 in school year 1992/1993 (after KEA-1) and 1993/94 (after KEA-2) (n=305).

The first group is considered as the control group.

Findings

Implementation of Adaptive Instruction

During the year the score on the instruction and management scale increased from 3.0-3.5 till 4 0-4.5(on a 5-point Likert scale). This is statistically significant One of six teachers didn't succeed in improving his behaviour in the desired direction.

Effects

There were no large differences between cohorts with respect to student background The educational level of the parents of the pupils is mainly primary education or less (61-67%) or the lowest track in secondary education or less (94-96%) Dutch language is the language used in only 17-21% of the families.

The achievements were statistically different between cohorts After KEA-1 has the highest scores, than after KEA-2 and KEA, the before KEA(control) group has the lowest achievement. The differences are larger in basic skills such as arithmetic speed, technical reading, spelling than in higher cognitive areas such as understanding of text and practice of arithmetic skills. The evaluators believe that this might be caused by problems in diagnosing higher cognitive test results. The kind of remedial instruction in lower cognitive areas is mostly simple: more practice is needed In relation to higher cognitive skills the causes of lower achievement can be many. This makes it more difficult to give remedial advice (based on personal communication with the evaluator) Another interesting finding is that the differences between cohorts are larger in Grade 3 than in Grade 4.

TABLE 2

Average Achievement on the Decoding Test' Nationally and for the Cohorts

Cohorts	*Achievement Technical Reading*	
	Grade 3	Grade 4
National	100	100
After KEA-2	115	
After KEA-1	123	98
KEA	95	94
before KEA	60	86

Implications for School Effectiveness

The projects showed that it was possible to improve the achievement of pupils in basic subjects in average schools as well in schools with a very high percentage of at-risk pupils. Pupils at the experimental schools outperformed pupils at control schools as well average pupils in the Netherlands So far the projects were successful. There are also some doubts about the sustainability of the effects. This effects in Grade 4 (compared to Grade3) diminishes in both projects. This could be attributed to the lack of reinforcement given by external change agents. It is also possible that accelerating learning in Grade 3 is more easy than in Grade 4. May be the less accelerated pupils gain more because they are more ready to learn.

Nevertheless, the explanation of the effect in Grade 3 is the improvement in adaptive instruction. At the classroom level, teachers have changed significantly resulting in implementing a high number of elements of adaptive instruction. To which extent the other teachers have changed, we don't know because data were only collected at grade 3. In the LPS-project the school counsellors were doing the class consultation. They invited the principals to join them because it was one of the long-term goals of the project· principals taking over the task of the class consultation. From personal experience we know that this failed. Most principals felt uneasy looking at their colleagues' implementation and giving feedback. This could be explained by the culture in primary education that principals are 'equals' in the school hierarchy without power to change teacher attitudes and behaviour.

In both projects new curricula were used or existing curricula revised. A suitable curriculum can assist a teacher strongly in the adaptation process. Without such a curriculum the task of the teacher is probably too difficult. In the LPS-project not all schools were using the new method for initial reading. They already used an existing curriculum and only wanted too add elements of adaptive instruction. This was not an ideal situation.

In the LPS-project monitoring and evaluation was performed mainly by the project board. School counsellors were confronted with data about the implementation of adaptive instruction

(collected by independent and trained observers) and data about their own behaviour. This information was used as feedback to the counsellors. They could use the information or not (frequent control was not possible).During the meetings the data were also used for setting targets for the counsellors. Especially the amount of class consultations was too low at the beginning of the project, and this type of consultation was most effective for some of the key goals. After looking classroom into the counsellors are better able to see the difference between goals and implementation of adaptive instruction and are able to advise more specifically. In the KEA-project the amount of class consultations is very high and this may contribute to the effect

The evaluation of both projects is performed with high standards of control Because of the many variables involved and the lack of advanced statistical techniques (multilevel analyses and LISREL) we still need a discussion as to what exactly contributes to the effectiveness of the projects. We believe the following factors could be of importance

- A new curriculum assisting teachers and adapted to pupils in learning the basics.
- An integrated approach (relating subject-specific, instruction-specific and pupil-specific matters) used in the classroom and for special groups of pupils if necessary.
- School counsellors assisting in planing, monitoring and giving feedback to teachers, the team and the principal. Class consultations were especially important
- Feedback and target-setting for the school counsellors by the project board

There were also shortcomings such as:

- differences in the curricula used
- the problem of consistency in personnel during longitudinal studies. In the LPS-project there were changes in counsellors and changes in the teachers instructing in Grade 3
- differences in strategies of school counsellors related to: starting directly with class consultations or waiting till

the third year; more time-spending on the teachers of Grade3 or more to the principal of the school; more time-spending on instructional matters or more time to subject specific themes. These differences could not be solved because just as the teacher is rather independent in his classroom, and so is the counsellor in his job

- there is not a culture of cohesion and control in Dutch education.

Without these limitations the effects of the experimental groups could have been higher.

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23

Awareness of Classroom Learning Processes of Normal Elementary and Special High School Students with Mental Retardation in Mathematics and Japanese Language

Surender Kumar   Susumu Harizuka

The study tried to examine the change in learning awareness and task achievement in 74 normals and 40 students with mental retardation at three IQ and achievement levels with the cooperative instructional appraoch for metacognitive training and general classroom instructional approach in mathematics and Japanese language. The findings of the study showed that students with mild intellectual deficiencies could gain in mathematics through cooperative instruction. It was found that language learning process was more difficult than mathematics of students with mental retardation.

Introduction

On awareness of one's classroom learning processes one can better describe the learned matter and how the matter was learned and can recognise it along with the related matters (Dunlosky and Thiede, 1994, Maki and Serra, 1992). Such awareness of learning processes reflects a concept called 'metacognition' which contributes in the metacognitive knowledge (Josephs, Silvera, and Giesler, 1996). Thus, it is considered that

by becoming aware of one's own learning process, an individual is better able to recognise, explain, and utilise the previous learned matter and processes in the other similar or somewhat different future life situations. The normal elementary students exhibited more awareness of learning processes at higher grade than at lower grade and in girls than in boys (Kumar and Harizuka, 1988a).

In students with mild and moderate mental retardation the awareness of learning processes was found comparably less in accordance with the normal controls of similar mental ages in different learning areas (Honeck, 1997), for example, processing efficiencies, attention, novelty, transformation abilities, social processes, language, perception problem-solving, and social processes. Bilsky and Judd (1986) showed that these children had deficiencies in respect of memory, context, and sentence construction. They focus more on sequential information than the semantic one (Abbeduto and Nuccio, 1991), and comparable awareness of response strategy and processing strategy of learning processes was found in them(Kumar and Harizuka, 1999) Moreover, students with mental retardation have shown their semi-awareness of the learning processes (Kumar and Harizuka, 1998c). The normal elementary school students who cooperatively solved a mathematical task could improve more in the awareness of learning processes as well as the task-achievement than the students who followed the general lecture-cum-demonstration instructional way to solve the similar task individually (Kumar and Harizuka, 1998b). Thus, it is possible that awareness of learning processes of different learning areas may vary with the subject-matter and the instructional approach in normals and students with mental retardation.

Aim of the study

The purpose of this study was to examine:(a) the change in learning awareness and task-achievement in normals and students with mental retardation at three IQ and achievement levels with the cooperative instructional approach for metacognitive training and the general classroom instructional approach in mathematics and Japanese language, and (b) to investigate the change in awareness of learning processes of

semantic content, response strategy, processing strategy, summarisation, and memory in three IQ groups of normals and students with mental retardation through cooperative instructional approach for metacognitive training and general classroom instructional approach in mathematics and Japanese language

Method

Participants. One hundred and fourteen students. (Mentally retarded (mild and moderate) Group: n =40 (M age =16 yr, M education = 9 8 yr., M IQ=57.1), Normal group: n= 74 (M age = 9 7 yr, M education=4.8 yr.) studying in special high school and elementary school were the participants in this study The normals and students with mental retardation had no history of illness other than one that caused mental retardation in them. All subjects were communicable and could follow the instruction of the study. Three groups were stratified on the basis of IQ (Tanaka-Binet Test) and achievement as measured by Raven's Progressive matrices.

TABLE 1

Pre-test Learning Awareness Mean Scores and SD in Three Groups

Groups		Basis on IQ	Basis on Raven's Test	Normal/ Challenged
A	M	38 5	38.3	38.0
	SD	2.93	3.63	3.4
B	M	36.38	35.9	—
	SD	2.89	3.5	—
C	M	34.68	35.2	35 7
	SD	3 98	3.61	3 5

Note: Categorisation on the basis of IQ A (Normal) = 70, B (Mild) = 55-69, C(Moderates with mental retardation) = 40-54 (Disabilities Education Act of America, 1992); On the basis of Raven's Achievement test A (High achievers) = 40-48, B (Average Achievers) = 33-39, C (Low achievers) = 08-32.

Material

1. Learning Awareness Questionnaire (Kumar and Harizuka, 1998a) in five learning areas: Semantic content, Response

strategy, Processing strategy, Summarisation, and Memory; on 17 items (Appendix-1). For example, if your friend asks you to tell him about yesterday's taught material in a subject how do you tell the matter? — (a) name of the book and number of pages in it (given one mark), (b) the interesting part in it (two marks) and (c) learned problem and the process how it was solved (three marks).

2. Raven's Progressive Matrices Test on A B C D sections. All the items were of matching type.

3. Thanaka-Binet test for IQ.

4. Performance tasks comprising of matching-type 25 items each from two grade-congruent subject matters in mathematics, native (Japanese) language of graded difficulty, Classroom teachers (n=5) rated the task on a 5-point scale in both subjects. There was no significant difference ($p>.05$) in Ratter's judgment tested by simple one-way ANOVA.

5. Development of cooperative instructional experience questionnaire on 9 items to be answered on Likert-type 5-point scale; for example, Do you think that your group members helped you how to get a proper answer of the problem when you were in difficulty ? (very much, 5 points-very less helped, 1 point)

6 Videotape Recording (VTR) of the sessions when studying through cooperative approach or following general classroom instructional way to solve the problems individually

Procedure

Administration of LAQ as pre-test, then mathematics or language problem solution in a 40-minute period for 7 days either through the cooperative instructional approach or the general classroom instructional way to solve the problems individually most of the time. Next, mathematics or language performance task was administered and followed by LAQ as post-test. After that, cooperative-learning experience

questionnaire and then Raven's Progressive Matrices for achievement categorisation. All the students were divided into high (40-48), medium (33-39), and low (08-32) achievers on the basis of their achievement measured by Raven's Progressive Matrices At last, Tanaka-Binet records for IQ were collected from the school to divide students in normals (above 70), mild-(55-70), and moderates with mental retardation (40-54) on the basis of IQs (Disabilities Education Act of America, 1992). All the study sessions were recorded on video to evaluate the cognitive and metacognitive activities in their learning processes when solving the task.

Results

Learning awareness scores were analysed with 3 (Group: low, medium, high IQ or Achievement) X 2 (Condition: pre, post LAQ) mixed factorial design within repeated measure in the condition factor. Students with mental retardation were less aware of their classroom learning awareness than matched - MA normal control students Classroom learning awareness in students was less at lower IQ and at low achievement levels (see Table 1) With the adjusted pre-learning awareness, students of three IQ levels differed in their achievement task scores of mathematics and language and across cooperative and general instructional approaches of classroom learning. Significant interaction of Approaches X Groups showed that the three groups differed in their achievement across cooperative and general classroom instructional approaches of learning (see Table 2). In a separate analysis of 3 Groups (IQ) X 5 Condition (learning areas) ANOVA within repeated measure in the condition factor, the three IQ groups were found to differ significantly at learning awareness of semantic content, response strategy, processing strategy, summarisation, and memory $\{F(2,50)=3.67, p<.05\}$. And interaction of condition X group was also significant. Condition effect was also significant, and indicated that the lower IQ level students were comparably aware at response strategy, processing strategy, and summarisation as the students of higher IQ levels.

TABLE 2

Mean and SD of Achievement Task Pre-test, Post-test LAQ Scores inm three IQ groups

Groups		*Cooperative*		*Competitive*	
		Maths	*Language*	*Maths*	*Language*
	n	10	10	10	10
A	M(SD)	18.8(2 35)	19 2 (3.26)	19.0 (4.71)	19 0 (2.50)
Pre-test	M(SD)	38.2(2 87)	35.9 (3.90)	35 9 (3.70)	38.3 (2 87)
Post-test	M(SD)	38.3(2.82)	37.8 (3 22)	38 2 (3.17)	38 0 (3.05)
	n	7	14	14	7
B	M(SD)	18 00 (4 43)	22.77 (1.14)	14.38 (6.73)	22.83 (0.98)
Pre-test	M(SD)	29 71(2.87)	37 39 (3.79)	34 71(3.79)	29 71 (2.87)
Post-test	M(SD)	37.83(2.71)	36 23 (3 59)	36 49 (2.79)	35.17 (0.75)
	n	13	6	6	13
B	M(SD)	13.92(4.01)	19 17 (0.71)	11 83 (6 15)	16.16 (4.09)
Pre-test	M(SD)	34 15(3.44)	37 50 (4.93)	30 00 (4.93)	34.15 (3.44)
Post-test	M(SD)	34.69(4.07)	38 33 (3.56)	35.17 (2.71)	32.77 (4 42)

Note: Maximum score for learning awareness = 51, Achievement task = 25.

The correlation between the scores of achievement, measured by Raven's Progressive Matrices, and learning awareness was found significant and weak correlated for matched - MA normal controls (N=75; Pearson r=.237; p<.05), whereas the correlation between achievement and learning awareness was not significant for the students with mental retardation (N=40; Pearson r=.153; p>.05).

Further, an analysis of variance in cooperative-learning awareness scores of matched - MA normal controls was done using a 2 (Subject: mathematics, language) X 5 (Condition: Semantic content, response strategy, processing strategy, summarization, memory) mixed factorial design with repeated measure in the condition factor. Condition effect was significant {F(4,312)=22.12, p<.001}. Subject effect {F(1,78)= 265, p=.61} and interaction of Condition X Subject {F(4,312)=.487, p=.74} was non-significant. This revealed that normals acquire similar awareness of their learning processes in mathematics and

language (Table-3) The tukey was non-significant among condition factor in mathematics and language for normal controls.

TABLE 3

Mean and Standard Deviation of Cooperative Learning Awareness Scores of Matched-MA Normals and Students with Mental Retardation in Mathematics and Native Language

Groups	*n*	*Semantic Content**		*Response Strategy*		*Processing Strategy*		*Summarisation*		*Memory*	
		M	SD	M	SD	M	SD	M	SD	M	SD
Matched -MA normal controls											
Maths	40	2 27	28	2.17	.32	2.21	.30	2 1	47	2 56	.42
Language	40	2 27	32	2.12	.34	2.11	62	2 05	.52	2.61	.39
Students with mental retardation											
Maths	30	2.1	.19	2.09	49	2.13	61	1 97	.56	2.29	.54
Language	30	1.82	46	2.31	.32	2.02	.53	2.03	.51	2.00	.43

The analysis of variance in cooperative instructional learning awareness scores of the students with mental retardation was done using a 2 (Subject: mathematics, language) × 5 (Condition: Semantic content, response strategy, processing strategy, summarisation, memory) mixed factorial design with repeated measure in the condition factor. Condition effect was significant {F(4,232)=2.749, p<.05}. Subject effect {F(1,58)=1.682, p=.20} was non-significant but the interaction of Condition × Subject {F(4,232)=3.367, p=.011} was found significant. It shows that mentally retarded students acquire somewhat different strategic awareness of semantic content and memory processes to their learning of mathematics and language (Table-3). The Tukey was non-significant among condition factor of response strategy {t (58)=1 98; p=.053}, processing strategy {t (58)= 785; p=.43}, and summarisation {t (58)=.485; p=.63} but significant in semantic content {t (58)=3.059; p=.003} and memory {t (58)=2.301; p=.025} factors in mathematics and language among subjects with mental retardation

The analysis of variance in cooperative instructional mathematics learning awareness scores of normals and the students with

mental retardation was done using a 2 (Group: matched-MA normal, mentally retarded) X 5 (Condition: Semantic content, response strategy, processing strategy, summarization, memory)mixed factorial design with repeated measure in the condition factor. Condition effect was significant {F(4,192)=4.416, p<.01}. Group effect {F (1,48)=6.429, p=.015} was significant but the interaction of condition X Group {F(4,192)=.173, p=.961} was found non-significant. The Tukey was non-significant among condition factor of response strategy {t(48)=1.02; p=.312}, processing strategy {t(48)=1.439; p=.157}, and summarisation {T(48)=.262, p=.794} but significant in semantic content {T (48) = 2.438; p=.019} and memory {t(48)=2.278, p=.027} factors in cooperative instructional mathematics learning awareness scores among normals and students with mental retardation.

The analysis of variance in cooperative instructional language learning awareness scores of normals and the students with mental retardation was done using a 2 (Group; normal, mentally retarded)X5 (Condition: Semantic content, response strategy, processing strategy, summarisation, memory) mixed factonal design with repeated measure in the condition factor. Condition effect was significant {F(4,192)=8.735, p<.001}. Group effect {F(1,48)=1.874, p= 177} was non-significant but the interaction of Condition X Group {F(4,192)=4.895, p=.001} was found significant. It shows that normals and mentally retarded subjects have different strategic awareness of semantic content and memory processes in language learning (table-4). The Tukey was non significant among condition factor of response strategy {t(48)=1.21; p=.232}, processing strategy {t(48)=1.245; p=.219}, and summarisation {t(48)=1.6; p=.116} but significant in semantic content {t(48)=3.409; p=.001} and memory {t(48)=2.834; p=.007} factors in cooperative instructional language learning awareness scores among normals and students with mental retardation.

Studying in Groups

(1) Ask the partner about what the problem is (cognitive).
(2) Each other check the answers to the problems (metacognitive).
(3)Everyone help each other in a group to understand and solve

TABLE 4

Mean and Standard Deviation of Cooperative Mathematics and Native Language Learning Awareness Scores of Matched - MA Normals and Students with Mental Retardation

Groups	n	Semantic Content		Response Strategy		Processing Strategy		Summarisation		Memory	
		M	SD	M	SD	M	SD	M	SD	M	SD
Mathematics											
Normals	25	2.26	.28	2.20	.32	2.16	.37	2.08	.43	2.51	.36
MRs	25	2.08	.26	2.10	.35	1.94	.67	2.12	.63	2.25	.42
Language											
Normals	25	2.29	.30	2.07	.32	2.08	.62	2.08	.47	2.61	.38
MRs	25	1.99	.31	2.20	.42	1.88	.51	2.30	.50	2.28	.45

the problem by themselves (metacognitive (4) Talk in different ways how to solve the problem (metacognitive). (5) Discuss on solved parts whether that is satisfactory to all groups members (metacognitive). (6) Every one has hearty involvement and works hard with smile on the face. (7) Discuss in pairs, in triples or with all group mates about problems (cognitive). (8) Consult teacher if any non-understandable problem to all (cognitive). (9) Develop greater interest in problem solution, e.g., "It was too short time", "Let us work hard on next problem" (metacognitive). (10) Time increased to concentrate on activity and to performance (cognitive). (11) Teach the peers to asked for help at the points where one wants detailed explanation (metacognitive). (12) Listen carefully others' ideas (cognitive). (13) Finish the shared work on time and every one equally participates to write down the chart on group ideas for presentation in front of all (metacognitive). (14) Time to discuss on the problem increased with the involvement of discussion on difficult matter and the ways of processes to solve it (metacognitive).(15) Use teaching aids effectively for task solution and realise its use for better understanding (cognitive).

Presentation

(1) Listen carefully and peacefully to other ideas and take notes when one presents the points emerged in group with mutual

discussion (cognitive) . (2) Confidently present own and group ideas(metacognitive) (3) Consideration of ideas common in all groups presentation (cognitive). (4) Get support and feedback to their responses by other problem-solving ideas (metacognitive. (5) At presentation and explanation of their ideas in front of all, they get better confidence and skills of presentation, explanation, and to defend their ideas (metacognitive) (6) Develop judgement to summarise a task within the time-limits of task (metacognitive). (7) By themselves, they can locate the mistake done in chart preparation, presentation or in explanation of group ideas (metacognitive) (8) Ask questions to clear their misunderstandings in presentation points and to enrich their knowledge about a task (metacognitive). (9) All group members could answer the questions asked by others and defended their conclusions (metacognitive). (10) Common problem arising in solution was put to the teacher to provide detailed explanation(cognitive). (11) For reconfirmation of their ideas they also consulted books (metacognitive). (12) Had mutual discussion with teacher on unclear points (metacognitive) (13) Effective use of chalkboard for explanations and clarifications was made by students. (14) Realises the mistakes done in solution or presentation. (15) Developed friendly environment and could answer the questions asked by teacher with confidence.

Cooperative instructional learning experience responses of their learning processes reflecting their importance for comparatively better learning were as below:

(1) "Studying in a group I feel interest, joy, and a zeal to help each other"(69%).

(2) "Group mates helped me much to find out the answer to the problem"(81%).

(3) "Others in group recognised most my ideas in solving the problem" (87%)

(4) "I recognised mostly the ideas of group mates"(90%)

(5) "I have a chance to present my ideas in front of whole/ group class"(75%)

(6) "I think that I helped the group mates most at his presentation"(69%)

(7) "I can mostly understand the meaning of a problem when I study in group" (97%)

(8) "I want most to study other subjects too with this approach"(91%)

(9) "I think that teaching aids and material helped me much for better understanding"(94%)

(10) "I got to understand and get explained more about the problem, more exchange of ideas with peers, more chance of presentation in front of all, and more use of teaching aids and their development is helpful when studying with cooperative instructional approach".

Discussion and Findings

Cooperative instructional learning awareness results showed that normals acquire similar type of learning awareness at learning mathematics and language whereas mentally retarded subjects reflected that they acquire incomparable awareness of learning in mathematics and language. Students with mental retardation showed less strategic awareness of semantic content and memory process to their learning in mathematics and native language in comparison to normals but possesses comparable awareness of response strategy, processing strategy, and summarisation. Thus, it further confirms our previous findings for comparable awareness of response strategy and processing strategy (Kumar and Harizuka, 1999) in students with mental retardation. Moreover, the equivalence of summarisation awareness of learning processes in children with mental retardation showed the importance of cooperative instructional learning activities. It is because of the metacognitive training involvement which makes the students more aware about their learning processes than a general instructional classroom approach

Significant correlation between achievement and learning awareness among normals is in the finding directions of Josephs, Silvera, and Giesler (1996). The weak correlation of such type among the students with mental retardation is a matter of consideration. Intellectual deficiencies and week reflection of their acquired knowledge in the form of learning awareness may be most visible cause for it Therefore, with the increase of awareness in learning it may be

possible to contribute in task performance and get more task-related knowledge with better understanding of their learning processes through metacognitive training on a task.

The study showed that the students with mild intellectual deficiencies could better gain in their awareness of learning processes in mathematics through cooperative instructions; and the students with moderate intellectual deficiencies could gain in learning awareness in mathematics through general instructions of classroom learning. It is because the students with mild intellectual deficiencies can focus more on interactions involved in a group than the students with moderate intellectual deficiencies who weakly focus on such interaction and try hard to focus on teacher instructions only.

Language learning-processes awareness were found more difficult than awareness in mathematics of the students with mental retardation. They gain more in awareness of learning processes in mathematics at learning through cooperative instructions Subject-matter, its structure, level of difficulty and way of presentation play a role in the awareness and learning of the students with mental retardation In mathematics, a fixed answer to a problem may provide better awareness of learning than in language as it needs broader area thinking to response a problem which creates confusion in these students to learn the subject matter with broad thinking It may be the possible reason for the difference in learning awareness of semantic content and memory processes of the students with mental retardation in comparison to the normal controls If the subject-matter is designed to create better awareness, it may be possible to gain in memory-awareness of learning processes with the awareness of other learning areas.

Students with mental retardation and normals of lower IQ and low achievement levels were found to be less aware of their learning processes. These students benefited more at their classroom learning awareness and task-achievement in mathematics than in native language following a cooperative instructional approach in fine learning areas Thus, interaction through cooperative instructional activities promotes learning awareness and the task-performance best in average levels of IQ and achievements.

Implication of Findings for School Effectiveness

The study revealed that the students with mild intellectual disabilities can focus more on learning a task-matter through cooperative instructions in mathematics than in language. It increases the awareness of response strategy, processing, and summarisation. Also, the students with mental retardation were found to get awareness of semi-awareness level on a standard task. An attempt to make them more aware of standard task through general classroom instructions cause information overload. Therefore, these students can best learn with a task of moderate difficulty to cope up with their semi-awareness level. Metacognitive training through cooperative instructional approach, involving group interaction, may provide them better awareness of semantic content and memory with response strategy, processing strategy, and summarisation aspects of learning processes on a task,which may further contribute in task performance.

Overall, the study showed the importance of learning awareness for the elementary normals and the students with mental retardation to gain in task performance in mathematics better than in a language through metacognitive training

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APPENDIX 1

Factor loading for Each Item of the Learning Awareness Questionnaire (N=60) with the Given Value Set at 1.50

Items in Learning Areas		*Factor Loading*
Semantic Content		
1	How do you know that which part of the subject matter is important	50
2.	If you are in a hurry and want to know some matter, which part of it you would like to read	70
3.	What do you do if you are reading a subject matter and did not understand the meaning of a part of it	53
4.	What do you do if you do not know the meaning of a sentence	63
5.	What do you do to remember the important information about a matter	64
Response Strategy		
6	How do you learn better a subject matter	56
7.	What do you do if you do not know how to solve a question	55
8	How do you proceed to write some thing	60
9.	What helps you most to prepare for a test	59
10.	How do you learn and remember a matter for further use	45
Processing Strategy		
11.	Before you start to read and write for learning the different things, what kind of plans do you make to help yourself	64
12.	How do you understand a matter better	77
Summarisation		
13.	How do you learn better the introductory part of a subject taught in each subject	67
14.	What do you do to remember the conclusion of a subject matter	77
Memory		
15.	How do you find the main character in a subject matter	59
16.	If your friend asks you to tell him/her yesterday's taught matter in a subject, how do you tell the matter	59
17.	Why do you go back and read a taught matter over again	68

Note: Three items were found redundant, therefore the final questionnaire was developed on the basis of 17 items . Split-half reliability (Pearson r=.79), the index of face validity (n=5) Pearson r was .70.

24

Enhancement of Learning Achievement in Mathematics of Handicapped Children through Activity-based Teaching

P. Das

The study aimed at identifying, and providing the remedial teaching through the activity-based approach to, the learning difficulties faced by handicapped children in mathematics at primary level. The study was conducted on 14 Class II deaf students. Diagnostic test was used as pre-test and learning difficulties were identified. The remedial teaching was provided with activity-based material and post-test was carried out. The study revealed that activity-based teaching enhanced the achievement of students in multiplication.

Introduction

Various research studies have reported that learning achievement of primary school children, in general, and in mathematics in particular, is far from satisfactory. The first survey of achievement of primary school children in mathematics conducted in 1965-66 (Kulkarni, 1970) and the second national survey on attainment of primary school children in mathematics and language conducted by Shukla et al., in 1990 revealed low levels of learning achievement. Similar studies undertaken by Dave and others (1988), Shukla et al. (1994), NCERT, NIEPA and New Concept Consultancy (1995), Saxena et al.(1995) and Prakash and Panda (1996) have also reported that numeracy and computational skills of primary school children are extremely low.

In the age of science and technology, a strong base of mathematics is absolutely necessary for all. Therefore how to develop the basic mathematical competencies among young children has been a problem for teachers, researchers etc. Keeping in view the developmental level of primary school children, developmental psychologists like Piaget and Bruner have emphasised the use of concrete objects for the development of mathematical concepts and skills. Mathematics is basically abstract in nature and to learn its various concepts, principles and rules, the child must be exposed to various context-specific activities with concrete objects The NPE (1986) and its programme of action have also recommended that child-centred and activity-based process of learning should be adopted at the primary stage. First-generation learners should be allowed to set their own pace and be given supplementary remedial instruction. As the child grows, the component of cognitive learning will be increased and skills organised through regular practice. In the context of primary mathematics, the MLLs document (1991) has specified that concrete objects and mathematical equipment need to be used through out the primary state in mathematics. Therefore, it is needless to mention the importance of activity-based teaching for the development of mathematical competencies among primary school children. This idea has well-tested support from empirical studies.

Many researchers are constantly engaged to study the effect of remedial measures using various activity-based strategies on the attainment level of primary school children. Das and Barua (1968), Rastogi (1983), Dutta (1986), Bhardwaj (1987), Bhanja (1990), Mishra (1991), Das (1996,1998), Dash (1996), Panda (1996), Goel (1997), Sahu (1997), Behera (1998), Singh (1998) and Tewari (1998) designed their studies to identify specific learning difficulties of elementary school children in mathematics and provided remedial measures in form of self-learning activities with adequate scope for practice. The findings of their studies have revealed that these intervention strategies have really enhanced the learning achievement of children in mathematics.

But unfortunately most of these researches have taken general children as their sample without giving due attention to handicapped/disabled children, who constitute a reasonable

segment of the children studying in primary schools. It has been really a neglected area. From the point of universalisation of elementary education it is equally important to understand the problem of this category of children very carefully and provide appropriate interventions for qualitative and quantitative improvement of their education. The major reasons for the inadequate number of research studies in this field may be lack of interest and expertise among the research institutions and researchers Therefore, it is high time for the researchers to give their due attention to this group of children and provide research-based intervention strategies for improving their learning outcomes. With this background in view, the present study has been designed with the following objectives.

Objectives

- To identify the learning difficulties of handicapped primary school children in mathematics
- To provide remedial teaching through activity- based approach using concrete materials.
- To determine the effect of remedial teaching on the learning achievement of handicapped children.
- To compare the learning achievement of handicapped boys and girls after the remedial teaching.

Hypotheses

1 There exists learning difficulties in mathematics of handicapped children at the primary level.

2. Activity-based teaching will enhance learning achievements of handicapped children in mathematics irrespective of sex.

Methodology

Sample

All the 14 Class II deaf children of Sri Harsha Mishra Memorial Deaf School, Bhubaneswar, were taken as sample. Theses students possessed addition and subtraction skills but were poor in multiplication and its related skills as reported by the

concerned mathematics teacher of the school on the basis of their classroom performances.

Tools

Two parallel forms of diagnostic tests were constructed on competencies related to multiplication for Class II These competencies are "concept of multiplication as repeated addition and symbol of 'X' and '=' (2.2.7 and 2.2.8)", "Multiplication tables of 1,2,3,4,5 and 10 (2 2.9)" and "Day-to-day word problems on multiplication (2 2.10)". The investigator developed two sets of 17 diagnostics test items each with 6 items related to sub-competencies 2.2.7 and 2.2 8, carrying 1 mark each, 8 items related to 2.2.9 carrying 1 mark each and 3 items related to 2 2 10 carrying 2 marks each The total marks assigned for 17 items of each set were 20 The first set of questions was meant for pre-testing and post-testing after the end of second session of remedial teaching and the second set was meant for post-testing after first remedial teaching.

Design and Procedure

The single group pre-test and post-test design was planned for this study. Accordingly, 14 deaf children of Class II were tested through first set of diagnostic tests as the pre-test. Those who secured 80% and above of the maximum score (i.e., 20) were levelled as Masters (M) and rest were Non-masters (NM). With the help of the Mathematics teacher of the school, the investigator conducted activity-based teaching for 4 weeks using activity-based materials developed by Regional Institution of Education, Bhubaneswar (1998). The concept of multiplication, its symbol and tables were developed using concrete objects and figures followed by guided practice activities for joyful learning and problem-solving. Then post-test-1 was administered to14 children and as per the criteria indicated above Masters and Non-masters were classified. The Masters were given multiplication tables of 6,7,8,9 as enrichment lessons and Non-masters were further put under remedial teaching with another set of activities followed by second post-test. Pre-test and post-test scores of deaf children on multiplication are given in Table 1. Table 2 shows pre-test and post-test mean scores of

Masters and Non-masters. Percentages of Masters and Non-masters of the whole group (N=14), boys (N=8) and girls (N=6), before and after first and second phase of remedial teaching are given in Tables 3 and 4, respectively

Conceptual Framework of the Study

Class II Mathematics Curriculum/Textbook of Orissa

Identification of Competencies in Multiplication

2.2.7 & 2.2.8 Concept of Multiplication as repeated addition & symbol 'x' and '='	2.2.9 Multiplication Tables of 1,2,3,4,5 and 10	2.2.10 Day-to-day Word Problems on Multiplication

Evaluation of Handicapped Children with Competency-based Diagnostic Test (DT-1) on Multiplication (Pre-test)

Masters	Non-Masters
Enrichment Lesson on Multiplication	Activity-based Remedial Teaching on Multiplication
	Evaluation through Diagnostic Test (DT-2) on Multiplication (Post-test)
Masters	Non-Masters
	Repeat Remedial Session

TABLE 1

Pre-test and post-Test (1 and 2) Scores of Class II Deaf Children (N=14) on Multiplication

Comptency No with MS	Pre-test Scores					Post-test Score (1)					Post-test Score (2)				
S.No. of the Students	MS in 2.2.7 & 2.2.8	M.S. in 2.2.9	MS in 2.2.10	total M.S.	Remarks	M.S. in 2.2.7 & 2.2.8	M.S. in 2.2.9	M.S in 2.2.10	Total MS	Remarks	M.S in 2.2.7 & 2.2.8	MS in 2.2.9	MS in 2.2.10	Total MS	Remarks
1(B)	5	5	2	12	NM	6	7	3	16	M-	-	-	-	-	-
2(B)	5	6	2	13	NM	6	7	5	18	M	-	-	-	-	-
3(B)	4	4	1	09	NM	5	4	3	12	NM	6	7	3	16	M
4(B)	5	6	4	15	NM	6	8	6	20	M	-	-	-	-	-
5(B)	5	6	3	14	NM	6	8	5	19	M	-	-	-	-	-
6(B)	5	5	3	13	NM	6	6	4	16	M	-	-	-	-	-
7(B)	3	3	0	06	NM	4	3	1	08	NM	5	5	1	11	NM
8(B)	2	2	0	04	NM	4	2	0	06	NM	5	4	1	10	NM
9(G)	5	4	3	12	NM	6	7	4	17	M.	-	-	-	-	-
10(G)	4	5	0	09	NM	5	6	2	13	NM	6	8	3	17	M
11(G)	4	5	1	10	NM	5	5	2	12	NM	6	8	2	16	M
12(G)	4	2	0	06	NM	5	4	0	09	NM	5	5	2	12	NM
13(G)	3	2	0	05	NM	4	3	1	08	NM	5	4	1	10	NM
14(G)	3	3	0	06	NM	4	3	1	08	NM	5	4	1	10	NM

B = Boy
G = Girl

M = Master
NM = Non-Master

MM = Maximum Mark
MS = Mark Secured

MM for 2.2.7 and 2.2.8 Competencies is 6
MM for 2.2.9 for Competency is 8
MM for 2.2.10 Competency is 6

TABLE 2

Pre-test and Post-Test (1 and 2) Mean Scores of Masters and Non-Masters in Multiplication

Test	*Pre-test*	*Post-test (1)*	*Post test (2)*
Group	Mean Score	Mean Score	Mean Score
Masters	0.0 (0)	17.67(1 63)	16 33 (0.39)
Non-Masters	9.57 (3.67)	9 50 (2.51)	10.60 (0.89)

Figures in parentheses indicate standard deviation

TABLE 3

Percentage of Masters and Non-Masters on Multiplication before and after First and Second Remedial Teaching

Remedial Teaching	*Masters*		*Non-Masters*	
	Number	*Percentage*	*Number*	*Percentage*
Before First Remedial Teaching	—	0	14	100
After first Remedial Teaching and Before Second Remedial Teaching	06	42.86	08	57.11
After Second Remedial Teaching	03	37.50	05	62.50

TABLE 4

Percentage of Masters and Non-Masters on Multiplication in terms of Boys and Girls before and after First and Second Remedial Teaching

Remedial Teaching	*Masters*				*Non-Masters*			
	Boys		*Girls*		*Boys*		*Girls*	
	No	%	No	%	No.	%	No.	%
Before First Remedial Teaching.	—	0	-	0	8	57.11	6	42.86
After First Remedial Teaching and Before Second Remedial Teaching	5	62 50	1	16 66	3	37.50	5	83.33
After Second Remedial Teaching	1	33 33	2	40	2	66.66	3	60

Discussion

From Table 1, pre-test scores clearly revealed that all 14 deaf children were found to be Non-Masters on multiplication. From post-test (1) score, it was found that 6 students acquired mastery level competencies and 8 students continued as Non-Masters, although they improved their achievement score as compared to their pre-test scores. After the second phase of remedial teaching, it was found that only 3 students acquired Mastery level and remaining 5 failed to do so although they improved their achievement scores. From the first and second phase of remedial teaching, it was clear that activity-based teaching has certainly enhanced the learning achievement of children in multiplication. But pre-test and post-test scores on word problems were extremely low which may be due to language deficiency and other related arithmetics skills. This findings is consistent with the findings of Jitendra et al. (1998) This demands adequate practice for which more time is required. Pre-test and post-test mean scores of Masters and Non-masters as presented in Table 2 confirm the trend of improvement of the deaf children in multiplication.

Table 3 shows percentages of Master and Non-Masters in multiplication before and after remedial teaching. The trend clearly shows that after first remedial teaching, 42.86 per cent of children have become Masters and at the end of the second remedial teaching another 37.50 per cent of children acquired Mastery level competencies in multiplication. Masters and Non-Masters in respect of sex have been given in Table 4 before and after remedial teaching. This indicates that 62.50 per cent of boys and 16.66 per cent of girls acquired Mastery level after first remedial teaching and 33.33 per cent of boys and 40 per cent of girls were found to be Masters and Non-Masters, respectively, after second remedial teaching. The findings of the study revealed that as a whole boys excelled girls on mastery level, so far as multiplication competencies are concerned,

Major Findings

1. Activity-based teaching on multiplication has enhanced learning achievement of Class II deaf children.

Solving word problems on multiplication was found to be difficult for deaf children irrespective of sex.

Boys excel girls in acquiring Mastery level in multiplication. This may be due to poor addition skills of girls which are essential for acquiring skills on multiplication.

Deaf children were found to be more motivated towards activity-based teaching and gradually gained confidence through this approach.

lucational Implications

The strategies used in this study to make children learn mathematics effectively shall be of great help to the teachers who handle these children.

The activity-based approach motivates children to learn better and hence leads to better achievement

It provides immense opportunities for the children in solving problems.

This study may provide feedback to teachers to develop alternative remedial strategy and use it if a set of activities fail to help the learners for better learning. In other words, the teachers may take up action research to find solutions of the problems encountered by them in the classroom.

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SECTION VIII

Managing Multigrade Teaching

The studies discussed in this section include:

- Case Studies of Multigrade Teaching in India and Canada: Implications for Improving Primary School Effectiveness
- Application of Multiple Interventions for Reducing the Workload of Teachers and Enhancement in Attainment of Competencies in Students of Rural Multigrade Primary Schools
- Leadership Profile in School Effectiveness—A Case Study

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Case Studies of Multigrade Teaching in India and Canada: Implications for Improving Primary School Effectiveness

Saloshini Muthayan

The study aimed at comparing the key findings of case studies of multigrade teaching in India and Canada to derive implications for primary school effectiveness in India. The research technique included literature review, interviews and classroom observations. The study found that despite similar problems in multigrade teaching in India and Canada, Canadian teachers managed their classrooms more effectively than their Indian counterparts. The study also highlighted the fact that the intervention programmes in India had limited success as they did not address the academic aspects of multigrade teaching.

Introduction

This paper has its origins in a wider research study which examines multigrade teaching in selected schools in India and Canada and its implication for improving multigrade teaching in South Africa, where basic education is characterised by a high incidence of drop-out, repetition and out-of-school children. It is estimated that over 50% of schools in South Africa are multigrade. It was considered that a comparison of the developing and developed world contexts might offer solutions to some of the problems confronting multigrade teaching in South Africa

The literature review undertaken in the research study showed that multigrade teaching has a long history and is prevalent throughout the world, both in developed and in developing countries. In India, 77% of classrooms are multigrade, while one out of every seven classrooms in Canada is multigrade. Multigrade teaching in India hearkens back to the ancient times, while in Canada it has been in existence for over a century. The high incidence of multigrade teaching at the primary school level in India and the likelihood that it is a permanent feature of the Indian education system implies that more attention ought to be given to these classrooms.

In this paper, the definition of multigrade teaching is a form of teaching in which in a single teacher teaches children of two or more grades, usually for administrative reasons such as student numbers and financial constraints. The respective grade levels are retained, as are the grade-specific curricula The single and two-teacher schools in India conformed to this definition.

Objectives

For the purpose of the seminar, the objectives shall be limited to a comparison of the key findings of the broader study, pertaining to multigrade teaching in selected India and Canada classrooms, and to consider their implications for improving school effectiveness in primary single and two-teacher (multigrade) classrooms in India.

Methods

Educational research of this social nature is value-laden-and a positivist approach, which seeks to be value-free and to quantify and explain social phenomenon, would have been inappropriate since ".... .. we are all rooted in a social world that is socially constructed". An interpretative, hermeneutic approach was considered suitable". Since its principle is understanding the way in which the individual creates, modifies and interprets the world". This approach is based on the assumption that rather than collecting data to validate a theory the" theory is emergent and 'grounded' on data generated by research act".

The research method consisted of two case studies of multigrade teaching in India and Canada. The research techniques include a literature review, interviews and observations. This allowed for triangulation of methods and the data obtained.

Techniques

The literature review contributed to an understanding of multigrade teaching in India and Canada and gave empirical evidence of the comparative effects of multigrade and single- grade teaching on the cognitive and non-cognitive development of children

The semi-structured interviews afforded a deeper exploration of information through open-ended questions. Interviews with Indian and Canadian researchers helped to contextualise the study and in the triangulation of sources.

The non-participant observations allowed the researcher to investigate ongoing behaviour and activity within the classroom without intruding on its natural setting and becoming too subjective, given the two different social context.

Selection of School

In both India and Canada, time and distance determined the number of schools visited and the duration of the visits. The selection of four schools in the Tumkur and Mysore districts in Karnataka, India, was arranged by the National Council for Educational Research and Training (NCERT). Under the auspices of NCERT, Professor Nagaraju accompanied the researcher on the visits.

In Canada, the Primary Teachers Association arranged the visits. The four selected schools were located in the Kamloops district of the Province of British Columbia

For the number of classrooms visited and interviewees, see Table 1 below, and for grade combinations age-range and class-size see Table 2 below.

TABLE 1

Number of Interviewees and Classrooms Observed

Country	Teachers	Principals	Parents/ Community	Other	Classrooms Observed
India	4	*0	5	4 researchers	4
Canada	5 + 2 support teachers	02	8	1 researcher 2 Ministry officials	4

* In two- teacher or one-roomed schools, the teacher usually served as the principal as well.

TABLE 2

Grade Combinations, Age-Range and Class-Size

Country	School 1			School 2			School 3			School 4		
India	Gr 1/2 G 3/4	6-8 yrs	35	Gr. 1/2	7-9 yrs	16	Gr 1/2	6-9 yrs	41	Gr 1-4	5-13 yrs	43
Canada	Gr 2/3	7-9 yrs	25	Gr K/1	5-7 yrs	26	Gr 3/4	7-9 yrs	24	Gr K to 7	5-13 yrs	18
	Gr K/1	5-7 yrs	27	Gr 1/2	6-8 yrs	23						

*Intwo- teacher or one-roomed schools, the teacher usually served as the principal as well

Bias

An inescapable bias might be the researcher's own worldview of education which has been influenced by Western norms and values. Hopefully, such bias might be mitigated by the researcher's constant awareness thereof, together with background experience of education of the disadvantaged in South Africa Furthermore, Professor Nagaraju, who accompanied the researcher to the Indian schools, helped to contextualise the research experience Lastly, it is hoped that the researcher's Indian origin contributed to some understanding and appreciation of certain cultural aspects.

Findings

A comparison of the findings may offer some implications for improving school effectiveness in India This comparison is made with some trepidation, taking into account the different social systems. As the exploration of multigrade teaching in these two contexts proceeded, it became evident that there may not be a best way for children to learn and develop and that what may be considered feasible ('best way') in one country may not necessarily be appropriate or successful in another. It is in the light of this that the comparisons are made.

Policy and Programme Initiatives

In recent years, there appear to have been several attempts to improve school effectiveness in primary schools in India. These have included government initiatives such as the National Policy on Education (NPE) (1986) and the Minimum Levels of Learning

(MLL's) (1991), and donor supported initiatives such as Operation Blackboard, the District Primary Education Project and numerous smaller localised projects Despite these initiatives, primary education continues to be plagued by problems identified by this seminar.

It is the researcher's view that these initiatives have not had the desired impact for two probable reasons.

1. They have not addressed multigrade teaching because it is regarded as a temporary phenomenon
2. Their focus has been directed narrowly at the provision of resources, either additional teachers or materials, rather than on ways to improve teaching and learning in the classroom

Multigrade teaching is not a temporary phenomenon. 77% of primary schools in India are multigrade. Of these, 95% are in marginalised, rural areas where the problems of school effectiveness are most severe. Despite this widespread occurrence, the education system as a whole pays inadequate attention to the proper functioning of multigrade schools. There is no reference to multigrade teaching in national policy documents. Multigrade teaching is considered a big problem in India. The education colleges rarely cover multigrade teaching in their syllabi and when they do, it is under the rubric of teaching problems. Thus, prospective teachers are encouraged to develop negative attitudes towards multigrade teaching even before entering the profession.

According to Nagaraju·

> *The approach is to look at rural primary schools as problem cases and the problem is more of paucity of resources to be overcome by other agencies, not of research and development to evolve alternate curricular and schooling structures in the domain of education.* (emphasis mine)

A demonstration of this approach are the Operation Blackboard and DPEP programmes to provide classrooms with blackboards and to change single-teacher schools to two-teacher schools. It seems that the installation of blackboards has served to

perpetuate the chalk and talk method of teaching, while the introduction of the second teacher has had no positive effect on the performance of the children in these schools. Instead, the majority of schools remain single-teacher schools because of teacher absenteeism, teachers arranging amongst themselves to teach shifts or the second teachers being deputed to another school to substitute for a teacher who may be on leave. It may be feasible for the intervention programmes to focus attention on the following issues instead:

- Adequate and relevant teacher education and support for multigrade teachers.
- In-service training on effective classroom, time and curriculum management and the utilisation of instructional strategies.
- Relevant research and policy development for improving multigrade teaching.

In the researcher's opinion, the intervention programme conducted by Nagaraju in the Tumkur district appears to be a more relevant intervention strategy. In comparison to the other Indian classrooms visited, the researcher found that this classroom was a beacon of improved quality of teaching and learning. This was indicated by:

- A committed, dedicated and enthusiastic teacher.
- Colourful activity-based materials made by the teacher.
- Students who appeared to be more engaged in the learning process than was evident in the other classrooms visited.

Initiatives of this kind require ongoing support. A shortcoming in this classroom was that the children were not allowed to have access to the activity-based materials and there was a lot of rote-learning rather than the use of group strategies.

Critical Similarities and Differences

Despite similarities in the education policy of India and Canada, such as the child-centred, activity and outcomes-based curricula,

and differences in situational context, namely developed and developing contexts, the problems surrounding multigrade teaching are the same:

- little or no official recognition of multigrade teaching.
- a lack of academic and financial support for multigrade teaching.
- lack of pre-and in-service training in multigrade teaching.
- very little research in this area.

Despite the similarity of the problems, the Canadian teachers appeared to manage multigrade teaching better than their Indian counterparts. Their relative success was indicated by:

1. The interested and engaged learners.
2. The effective use of instructional time through various instructional strategies.
3. The teachers' commitment and dedication to teaching indicated, for example, by their after-hours presence in the classroom and the time they devote during vacations and weekends to planning.

The Canadian respondents believed that the key to successful multigrade teaching was the teacher One parent declared: I think the teacher is the biggest thing.

The success of these teachers was attributed to the following skills:

1. An ability to organise, plan and utilise time effectively.
2. A good understanding of the needs and interests of children.
3. A good knowledge of the curriculum, especially the integration of the curriculum for teaching both across the grades and the learning areas.
4. A positing attitude towards multigrade teaching.
5. Qualities such as flexibility, innovativeness, commitment and dedication.

6. Experience gained in multigrade teaching.
7. An ability to communicate with parents and involve them in the school.

In contrast, multigrade teaching in India was characterised by the following problems:

- Ineffective classroom management and organisation.
- An ineffective use of instructional time in the classroom.
- A lack of knowledge about curriculum management and effective instructional strategies for multigrade teaching.

The teacher' difficulties in coping were indicated by.

1. A lack of evidence of regular planning by the teachers. Instead, the annual plan emanated from the Block office.
2. Noisy learners who appeared bored and disinterested in the rote-learning and copy-writing exercises.
3. A heavy reliance on teacher-directed instruction with little evidence of other form of groping strategies, for example, small group work or peer-tutoring strategies.
4 The teaching of the MLL's rather than perceiving them as indicators of desired outcomes for the learning process
5. A limited understanding of the basic tenets of the curriculum, i.e., child-centred and activity-based approach. For example, the needs and interests of the children were not taken into account when designing activities, nor did the children have free access to materials.
6. An inefficient and ineffective use of available materials by some teachers, i.e., either they did not use them at all or they did not know how to use the materials.
7. A dependence on the blackboard and textbooks.

Despite the similarities in multigrade teaching in these two contexts, the relative success of the Canadian teachers in comparison to the Indian teachers warrants some investigation.

The answer may lie in the kind of teacher education Canadian teachers received or the appropriateness of the child-centred approach within their context.

Teacher Education

Teacher education in Canada does not prepare teachers specifically for multigrade teaching: The assumption. ... (at) the universities in the city is that everybody is going to end up in some nice school where there was one grade in every classroom and you just follow the separate curriculum. This view of a teacher is verified by the empirical findings of Canadian researcher, Gajadharsing.

However, the course work at the universities included" . . teaching strategies that would apply in a multigrade situation". Teachers received preparation for teaching approaches that are child-centred, participatory, activity-based, flexible and open-ended, encouraging an understanding of multiple-intelligences and the utilisation of a range of instructional strategies teaching. One teacher had served her practicum in a multigrade classroom thereby receiving the opportunity to observe and learn from more experienced multigrade teachers, the apprenticeship model "what made it (easy) for me was being in that classroom for my practicum I saw it in operation, I saw it first-hand I went to my classroom and I did exactly what she did and it worked."

Canadian teachers used their own initiative to transfer and adapt their training for application to the multigrade classroom. Their apparent success may be the result of the critical thinking skills and the sense of professionalism they develop during their training. They indicated that they constantly searched through reference books for new ways of promoting teaching and learning in the classroom. In India, teacher education institutions not only pay no attention to multigrade teaching but they have not heeded the almost ten-year-old policy directive (NPE and the MLL's) for child-centred and activity-based approaches. There was little to no evidence of a child-centred approach in the Indian classrooms. Any pre-or in-service either did not cover this, or did not achieve the desired effect. In addition, these teachers were not afforded an opportunity to observe and learn from more

experienced teachers. These schools were mainly single or two-teacher schools

The Indian teachers under observation, save for one, did not evince much initiative and creativity. Instead, they appeared to be awaiting instructions from higher up. Consequently, they were ill equipped to manage their multigrade classrooms successfully.

A comparison of the two models seems to indicate that relevant and appropriate teacher education which is in tandem with current policy, is essential for improving teaching practice in primary classrooms, especially multigrade classrooms.

While it is highly recommended that teacher education institutions focus on multigrade teaching, the Canadian experience seems to indicate that it is possible to equip teachers with universal knowledge, skills and values that may be applicable to any teaching situation, including multigrade teaching It is essential that this form of teacher education builds critical thinking skills, flexibility and open-ended, child-centred and activity-based approaches and the utilisation of effective instructional strategies. A Canadian researcher, emphasised that teacher education incorporate the transfer of teaching techniques that teachers ought to use in the classroom and the emphasis should be on the processes of teaching and learning not on the content. This may be achieved through experiential methods of training.

The Policy of Child-centred Approach

The Canadian and Indian curricula policies are based on the principles of child-centredness, learner participation and activity-based approaches. However, the tenets of child-centredness and activity-based approaches are not understood and implemented by the Indian teachers. Conventional practice, according to which the teachers themselves were educated, abides because they have not internalised the new policy. For the Canadian teachers, on the other hand, child-centredness is a norm of the society in which they find themselves.

Implications

Primary schooling in India encounters multifarious problems not unlike those experienced in many developing countries. Recent

attempts to improve the quality of teaching and learning have had limited success because they fail to recognise that the majority of primary schools in India are multigrade. The findings of this study have implications for improving primary eduction in India because the strategies to bring about effective multigrade teaching may be applicable to all forms of teaching. For example, child-centred approaches, integration of the curriculum and a variety of grouping techniques which are essential for catering for the diversity of ages in a multigrade classroom, may be equally effective in single-grade classroom where there are a range of abilities and interests even among sameage children. This calls for the abandonment of teacher-directed, textbook-based learning with parrot-fashion rote-learning and copy-writing in favour of child-centred, activity-based learning with learner participation and appropriate grouping techniques. This study offers the following implications for improving school effectiveness

"The Teacher is the Biggest Thing"

The education system and teachers themselves need to recognise that the teacher is the main resource. This does not imply that additional teachers have to be appointed, as in the case of the "two-teacher policy, but rather that the intervention may invest in improving the existing teacher's knowledge, skills and attitudes to manage teaching and learning more effectively.

Teach Teachers The Way You Want Them to Teach

Training methodology may include adult education techniques that are learner-centred, experiential, participatory and activity-based. This may encourage teachers to understand- and adopt learners centred approaches in their classrooms.

Policy For All (PFA)

Teacher education and intervention programmes should to familiarise teachers and education support staff with the philosophy and principles underlying the policies. Teachers need to understand why they should change their practice before they are introduced to in-service training on materials and instructional strategies, as has been the existing practice in India. If teachers understand and appreciate the concepts of and

rationale for child-centredness, learner participation and activity-based approaches, they will be able to use any kind of materials or strategies in the desired way. If not, no amount of sound policy, programmes or materials will be implemented in the intended manner. In addition, those responsible for in-service training may not have understood the policy themselves. If this is the case, they too should be the target of training programmes.

The current practice of teacher-directed, textbook-based learning accompanied by rote- learning, copy-writing, inflexibility and rigid disciplinary procedures are counterproductive to the vision contained in the NPE and the MLL's.

Policy Cannot be Imposed; It Must Match the Socio-economic System

The child-centred, activity-based approach to learning is based on Western theories of education. The intentions of the NPE and the MLL's, to implement child-centred, activity-based approaches are laudable. However, India the largest democracy in the world, remains a traditional, stratified society where there is a strong reverence for education and age. Hence, it is not the norm for teachers, who usually emanate from a higher social echelon, to consider themselves accountable to either the children or the parents. A child-centred approach implies respect for the child, basing the programme on the needs and interests of the child and the child's right to question things. The question remains: how relevant and successful can this approach be within the context of traditional societies in the developing world? Perhaps it is necessary to identify exactly what is intended through such approaches and whether they are not better achieved through alternative means in different societies. Further research is needed on the appropriateness of Western theories of child development and their application in developing countries.

Support Means Support

Inspectors at the block level are an expensive resource in the education system. They could play a more meaningful support role in the implementation of the well-intended policies. Unfortunately, being usually former secondary school teachers, they do not understand the broader issues of primary education

let alone the MLL's programme Instead of providing an administrative function alone, they could provide academic support to the teachers as well. An additional form of support that they may institute is that of teachers forming peer groups to share common experiences

There Is no Substitute for Good Planning

Time invested in regular and methodical planning is time saved and a well-managed classroom. Teachers need to assume full responsibility for planning and organising their classroom, programme and activities. If the programme is interesting to the teacher, his/her enthusiasm will invoke the interest of the children and instructional time will be used more effectively.

Variety Is The Spice of Life

There is no one 'best way' in a multigrade classroom, or any classroom for that matter. A variety of instructional strategies may be employed in the multigrade classroom. These include: thematic teaching, cooperative learning, various grouping techniques, peer-tutoring, self-directed learning and individualised learning. Canadian teachers found a various grouping techniques, commencing with whole, class instruction, followed by small groups, peer-tutoring or self-directed learning to be most effective. This afforded the teacher the opportunity to instruct individual children. In a multigrade classroom, there are potentially many mentors in addition to the teacher. One Canadian teacher claimed that she had a ratio of 25:25 rather than 25.1, implying 25 learners and 25 teachers.

"Materials Are an Aid Not a Substitute for Good Teaching"

It cannot be denied that materials are important for enhancing the quality of effective teaching and learning. However, materials are not an end in themselves but a means to achieving effective teaching and learning and they should be consistent with the principles of the policy framework There appears to have been a preoccupation with materials in many of the intervention programmes mentioned earlier. This heavy

reliance on materials has not been balanced by adequate training on the policy, curriculum and instructional strategies. The teacher should be assisted to link the materials with the philosophy of how children learn most effectively. Moreover, intervention programmes should encourage teachers to view themselves as a major resource and to take the initiative to be innovative by developing their own materials from natural and waste resources.

In a child-centred, activity-based approach it is essential that the children have access to the materials. This was not evident even in the most effective classroom visited in India.

"Teachers Must Know the Curriculum Inside Out and Upside Down"

Teachers need to know more about the curriculum than the 3 principles and MLL's chart which seems to be used to make meaningless ticks indicating outcomes attained, under pressure from the inspectors. This will avert the current tendency to teach the MLL's rather than guiding the children's development through a process which will arrive at the MLL's as the end-points. Thematic teaching may be used as a vehicle for integrating the curriculum which should aim to build on the prior knowledge of the children and be based on their needs and interests. An example of this approach was the "know-wonder" web which was used for planning themes in Canada.

The curriculum should not dictate the kind of teaching and learning that happens in the classroom. Instead, the teacher has to take into account the diversity of learner needs and the differing expectations, and implement the curriculum accordingly.

Conclusions

Multigrade teaching is not merely an alternative but a good alternative at that.

- Multigrade classrooms can cater for a diversity of learners. Single-grade classrooms, with their grade-specific curriculum, usually do not provide for such diversity. The multigrade classroom was found to be beneficial also for culturally diverse

groups. For example, the older First Nation's children in Canada provide support and comfort for their younger peers.

- A child-centred, flexible approach need not imply a lack of discipline. One of the benefits of multigrade grouping is that the older children may set an example for the younger children to emulate.
- At the very least, multigrade teaching is not harmful to the development of children. Canadian teachers in general and one Indian teacher believed that multigrade classes were as beneficial to the children cognitively, and in some instances better than single grade classrooms. In terms of their non-cognitive or psychosocial development, the respondents believed that children in multigrade classrooms fared better, than their single-grade counterparts. It was found that there were more advantages for the children in multigrade teaching than in single-grade teaching. Any disadvantages perceived, pertained mainly to the teacher. The empirical evidence of research studies supports these views. According to Bacharach, the theoretical frameworks of Piaget, Bandura, Vygotsky, Erikson, Bronfernbrenner and Bruner lay the foundation for multgrade teaching. Put differently, it may be argued that multigrade teaching is not antithetical to current theories nor child development.
- Amongst the cognitive advantages, was role-modelling and the opportunity to interact with more and less advanced peers (Vygotsky's theory of the zone of proximal development). The non-cognitive advantages included the family atmosphere, which led to more caring, sharing and consideration for others. There were benefits for the teaching and learning process, too. These included the developmentally appropriate curricula catering to the needs of the learners; individualised instruction in response to the diverse needs; teachers being forced to plan; integrated curriculum and instruction and a diversity of programmes.
- It may be concluded that multigrade teaching ought to be considered as a viable alternative to single-grade teaching, and instead of viewing it as a temporary phenomenon, it should be viewed as an opportunity for improving school effectiveness.

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26

Application of Multiple Interventions for Reducing the Workload of Teachers and Enhancement in Attainment of Competencies in Students of Rural Multigrade Primary Schools

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The objectives of the study were: to investigate the inadequacies existing in teaching-learning in the multigrade schools and to find out the effect of multiple interventions in improving the level of concept attainment among Class I and Class II students. The sample of the study included three primary multigrade schools functioning in rural areas in Dhenkanal District, Orissa. The effect of a multiple intervention package was judged on a sample of 61 and 36 students of Classes I and II, respectively. The multigrade intervention package included the classroom components related to classroom organisation, time management, teaching-learning strategies, remedial instruction and support material for the teachers as well as for children. The findings of the study indicated that concept attainment in language and mathematics can be remarkably improved by interlinking them with non-scholastic areas.

Introduction

The *Sixth All India Educational Survey* (NCERT, 1998) has reported that 62.03 per cent of primary schools are functioning in the

multigrade context. Again, out of 570455 primary schools in India, 507581 primary schools are located in rural areas. In Orissa alone the percentage in multigrade schools is approximately 66 per cent of the total primary schools. The teachers of these schools are under tremendous stress due to excessive workload, large-sized classes, non-availability of materials, poor level of motivation of the learners and high percentage of drop-out. This study has attempted to field-test a few interventions in order to improve the quality of teaching-learning in these schools.

Objectives

This study had the following objectives:

- to identify the difficulties of teaching-learning in multigrade schools
- to find out the effectiveness of multiple interventions to improve the attainment of competencies by students of primary schools functioning in the multigrade context in rural area.
- to find out the learning difficulties and hard spots in the area of language and mathematics in Classes I and II.

Methodology

(a) Instrumentation

1. An observation schedule was designed in order to observe the classroom transaction of multigrade schools located in Dhenkanal district of Orissa for identifying the difficulties faced by teachers of mutigrade primary schools located in rural areas.
2. Personal interviews of teachers and students were conducted with the help of semi-structure interview schedules in order to assess learning difficulties.
3. A Diagnostics Test (oral and written) was formulated and administered in order to identify the hard spots in learning.

Sample Frame

Three primary schools working in the multigrade context located in rural areas in the Dhenkanal district of Orissa were taken as sample, which had the following student strength in Classes 1 to V.

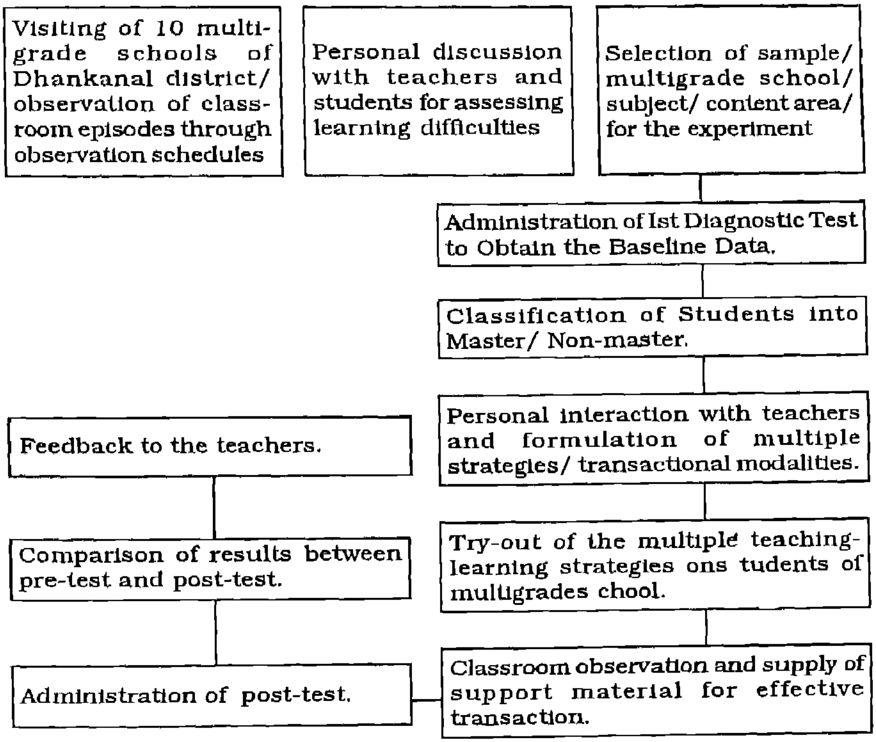
Name of the Multigrade Schools	I	II	III	IV	V
1. Amlapada Primary School	25	14	11	8	7
2 Godianali Primary Schooll	15	7	4	7	9
3 Madhuban Primary School	21	15	9	11	6
Total Sample	61	36	24	26	22

Collection of Baseline Data

A pre-test was administered to the students of Classes I and II in the area of language and mathematics in order to collect the baseline data.

Conceptual Framework

The following flow chart shows the conceptual framework of the study.



Subjects

Integrated contents of mathematics, language, art education, EVS and physical education were taught in Classes I and II in combination.

Content Area

The following content areas activities of different subjects were chosen for transaction in integration class-wise:

Subject/ Class	Competencies of Different Subjects Integrated	Activities Suggested/ Learning Mode
Language Classes I and II	1. Speaking/ Listening comptency of Language was integrated with EVs concepts like — parts of our body, personal cleanliness, seasons, transport, materials around, us, food we take etc.	Drawing pictures, preparing clay models and toys, by collecting naturally available materials— - self-learning/ group-learning
	2. Reading competency: the difficult spellings of the content area of EVs were listed and word cards were prepared to give practice of loud reading.	Preparation of word cards as support material for classroom transaction — monitor-assisted learning/ teacher-guided learning.
	3 Writing the number, names in words, names of geometric figures in maths, names of flowers, fruits, animals having conjunct letters were listed and writing competence was developed: Regular practice was given to constructing sentences using these words	Preparation of individual word cards and activity sheets having conjunct letters - teacher guided learning/ group-learning.
Maths Classes I and II	1. Contents of maths like counting numbers, writing numbers and words of number names were integrated suitably with art education and SUPW.	Preparation of picture cards - group learning/teacher guided learning.

Subject/ Class	Competencies of Different Subjects Integrated	Activities Suggested/ Learning Mode
Maths Classes I and II	2. Competencies like place value, arrangement of numbers, greater and smaller number were integrated with physical education.	By organising interesting games with students' participation by involving numbers—peer-learning/ monitor-assisted learning.
	3 Concept of mental addition and subtraction was corelated with speaking and listening competency of language.	Narration of dialogues/ instructions in familiar situation involving addition and sub-traction (orally teacher-guided learning).

Multiple Interventions applied to improve the Teaching-Learning

Though the interventions were given to all the grades from Classes I to V, but the administration of the diagnostic tests and analysis of the data was limited to Classes I and II since the study was restricted to Classes 1and II. This facilitated remedial instruction for attaining mastery over the fundamental concepts of language and mathematics.

The following interventions were applied to improve the process of teaching-learning:

Intervention I

Classroom Reorganisation: In all the schools Class 1 was combined with Class III and Class II was combined with Classes IV and V as a result of which similar activities could not be performed. The investigator suggested reorganisation by grouping of grades with lesser age difference, i e. Class I with II, and III and IV with V so that similar activities could be organised through content integration.

Intervention II

Timetable Reorganisation: Flexibility was adapted to reorganise the time table by integrating each language and EVS period with art education, music, SUPW and maths with physical education.

Intervention III

Space Management: Due to shortage of space in classrooms in rural primary schools outdoor activities were performed more by taking the children outside the classroom to transact a number of concepts like vocabulary, sound discrimination, verbal expression in language, counting in ascending and descending order, mental addition, subtraction, etc.

Intervention IV

Group Management. Mixed-ability grouping was organised for whole-class activities to transact the content of EVS-parts of the body, food we take, care of our body parts by suitably integrating the concepts with the speaking and listening skills of language.

Intervention V

Meaningful Integrations of Content Related to Various Subject Areas in Same Class.

Concepts of numbers, alphabets, conjunct letters, words with conjunct letters etc., were, meaningfully integrated with art education. Self-learning materials were prepared for reading and writing by preparing individual word cards/number cards, etc. Such integration provided a wide scope for active participation of children and facilitated joyful learning in a group situation.

Intervention VI

Organisation of Activities on Content of Same Subject Across Different Classes.

Content	Class I	Class II	Strategy
Maths	Counting (1-99)	Writing Numbers (100-999)	Identifying missing number from word card, counting with leaves, marbles, stones, match Stick
	* Place Value One, tens	(ones, tens, hundreds)	Making bundle of sticks, using beads
	*Arrangement of Numbers		Using number cards, outdoor games-physical exercies.
	*Mental Addition	(Subtraction) peer-tutoring.	Monitor-assisted learning, teacher-guided learning
Lang-uage	Speaking	Listening	Initiate interaction by showing picture, narrating situations, etc.
	Reading/ Writing/ Dictation	Copy Writing	Self-learning material, word cards, Word games
EVs Living Things	Natural things — man made Things	Parts of a plant; uses of plants/animals	Organ system of human body
Strategy	Observation of things around and drawing pictures and grouping them	Demonstration by teacher.	Self-learning material.

Intervention VII

Providing Improved Learning Environment in the Classroom:

(a) Installation of improvised wall display board in the classrooms

- The investigator visited all the 3 schools and demonstrated to the teachers how to instal wall display board by fixing rectangular/square piece of cloth/saree/gunny bag

measuring 4'/2' The students were encouraged and guided to display their day-to-day activities performed in art/craft/ language/math and EVs by fixing them on the display board. This enabled the slow learners and students with learning disabilities to improve their performance by self-initiation.

(b) *Making arrangement for self-learning activities inside the class*

- Students were asked to collect stones, marbles, matchsticks, seeds, pebbles, pictures etc. which were kept in separate cardboard boxes. A small corner of the classroom was used to keep the cardboard boxes displayed so that the children had free access to handle them through monitor-assisted learning and in the group-learning mode when the teacher is busy with the other class in direct teaching.

Intervention VIII

Providing support materials to the teachers

The majority of the children of these rural schools did not have facilities and materials like colours, pencil, drawing sheets, etc. to prepare individual support materials. So the investigator collected hundreds of self-learning materials in the area of language, maths and EVS, prepared by the students of D.M. School, RIE, and distributed them to all the three schools. The teachers revised and redesigned the contents in regional language to utilise these appropriately. Many self-learning materials were only through pictures in EVS depicting conceptual ideas like states of matter, sources of energy, interchangeability of energy, uses of electrical energy, natural things/man made things/living/ non-living things, etc.

Intervention IX

Organising of Remedial Activities for Children Having Learning Disabilities

The majority of the children of Class I and a few of Class II had learning deficiencies in the fundamental concepts of language/ maths and demanded relearning. They were engaged in relearning by using word cards, number cards through self-learning mode/peer tutoring/monitor-assisted learning when the teacher

was engaged in direct transaction with other grade students. This repetition helped in drilling the concepts and enabled the students to attain mastery.

1. Personal Interaction with Teacher and Orientation of Teachers

The investigator had oriented the teachers working in concerned multigrade primary schools in multiple strategies of managing classroom transaction through personal discussion and guidance.

2. Duration of the Experiment

The study was conducted in three multigrade primary schools of Dhenkanal district for a period of 9 months, from April 1998 to December 1998.

3. Administration of Post-Test

After the above nine intervention by the teacher a post test was conducted on the same set of students in the same competency areas.

4. Analysis and Interpretation of Data

Table 1 (given at page 410) shows pre-test and post-test results in different competency-areas of language and maths in Classes I and II.

Findings

1. Pre-test results reveal that a significant number of students are non-masters in different contents and competency areas. However, the post-test results reveal that the number of non-masters have been reduced in both the subject areas of language and mathematics in Class I and II. This significant reduction in the number of non-masters is due to application of multiple innovative strategies which the teachers have applied appropriately in the classroom.
2. It is observed that if the strategies could be planned properly according to the content area to be transacted and executed successfully, it will not only reduce the workload of the teachers but will also act as a remedial instruction.

TABLE 1

Class/Subject Competency	*Pre-test*			*Post-test*		
Area	Non-Master	Master	% of Master	Non-Master	Master	% of Master
Math Class I	Sample-61			Sample-50		
Counting Numbers	21	40	65.57	15	45	90
Place value	33	28	45.9	16	34	68
Arrangement of numbers	39	22	36 06	22	28	56
Mental addition	47	14	22.9	20	30	60
Mental subtraction	43	18	29.5	22	28	56
Language Class II	Sample 36			Sample 30		
Number writing in figure	18	18	50	18	22	73 3
Number writing in words	20	16	44.5	6	24	80
Place value	18	28	77 7	4	26	86.6
Arrangement of number	12	24	66.6	2	28	93.3
Mental addition	25	11	30.5	12	18	60
Mental subtraction	27	9	25	15	15	50
Language Class I	Sample 61			Sample 50		
Listening	31	30	49.18	17	33	66
Speaking	36	25	41.0	11	39	78
Reading	25	36	59.01	29	31	62
Dictation	31	30	49.18	30	30	60
Copying words/letters	34	27	44.26	25	35	70
Writing words with Matras	40	21	34.42	16	34	68
Language Class II	Sample 36			Sample 30		
Listening	21	15	41.6	10	20	66 6
Speaking	14	22	61 11	16	24	80
Reading	16	20	55.5	4	25	83.3
Dictation	12	24	66.6	4	26	72.2
Words with conjunct letters	13	20	55.5	5	25	83.3
Writing sentences	18	18	50	8	22	73.3

3. Use of self-learning materials helped teachers to detect the learning difficulties instantly.
4. Transaction of activities conducted in groups combining the students of Class I with these of Class II promoted better scope for concept-attainment in students.

Implication of the Findings for School Effectiveness

Due to resource constraints it will not be possible to appoint more teachers immediately to improve the teaching-learning in multigrade schools.

But the use of multiple strategies has potential not only in reducing the content load of teachers, but also in the attaining of desirable level of competencies by the students. There is a need to formulate training strategies for the teachers working in rural multigrade primary schools in different intervention areas.

The reconstructed curriculum, timetable, and innovative pedagogic interventions provide a clear vision to the administrators to understand the training needs of teachers working in rural multigrade primary schools.

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27

Leadership Profile in School Effectiveness — A Case Study

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The study was carried out with the aim of finding out the effect of leadership on school effectiveness. It was also aimed at finding out the contribution of human resource management components to school effectiveness. The case study approach was followed and thus three most effective and three most ineffective schools were selected for the sample of the study. Five-point rating scales on leadership and school effectiveness, separately, were developed and administered to parents, teachers and students of selected schools. In-depth school observations were also recorded for qualitative data. The findings showed that the leadership components had positive effect on school effectiveness.

The Movement for Excellence in education all over the globe is a welcome phenomenon. It has a great significance at the beginning of the 21st century. Essentially excellence is a function of personal aspiration and accomplishment and therefore is the property of the individual.

Schooling has been providing a basic education (primary), a advanced education (secondary) and a higher education (college level), and it intends to provide intellectual, economic, political and social growth and leadership. Schools have both reflected their society and contributed to its growth. A school system

serves the nation's need by providing suitably qualified manpower. For this, quality management is needed. Total quality management is reflected in the effectiveness of a school which in turn is based on the quality of educational leadership.

Background

The recent researches in school effectiveness emphasise that institutional improvement and quality management should be taken care of. A number of studies have identified a number of factors of effective schools like professional leadership, shared vision and goals, learning environment purposeful teaching, high expectations, positive reinforcement, monitoring progress, parental involvement and learning organisation Of these factors, professional leadership plays a vital role in initiating, maintaining and improving the above said factors of an effective school.

Another recently emerging discipline is human resource management. This area has not been explored much by the educationists. Human Resource Management Science has identified four components, namely, leadership, relationship, performance and organisational design.

Leadership :	Concerned with vision and growth.
Relationship :	Concerned with task and people and the quality of personal relationship.
Performance :	Providing the means to enhance competency and stimulate development in order to achieve organisational objectives.
Organisational Design :	Establishing a structure wherefrom follow functions which contribute directly to institutional purpose and process.

Leadership Perspective : Rationale

School effectiveness research suggests that the principal's role is crucial to school improvement, Dwyer et al. (1982) opine that

there are no simple ways to understand the effects of principals' behaviour on schools and more studies are needed on principals' behaviour. Cohen(1983) suggests that principals must do more than provide instructional leadership. Gall et al.'s (1984) study provides experimental evidence that principals' leadership affects teachers' behaviour and students' achievement.

Effective school research is concerned not only with the question of where schools vary and by how much, but also with the question of what the difference can be attributed to. It is high time to analyse which of the school effectiveness factors are the most important and which factors determine the other factors. In this perspective, the present study highlights the leadership perspective as the determining feature of school effectiveness. Leadership, which is one of the components of the HRM, plays a pivotal role in an educational setting.

Leadership: Definition

"Leadership is the activity of influencing people to strive willingly for group objectives."

George R. Terry

"Leadership is influencing people to follow in the achievement of a common goal."

Harold Koontz and Cyril O' Donnel

"Leadership is interpersonal influence exercised in a situation and directed through the communication process, toward the attainment of a specialised goals or goals."

Robert Tannerbaum, Irwing R. Weschler and Fred Massarik

"Leaders teach." Lincoln, in his second inaugural address, provided an extraordinary example of the leader as teacher. "Teaching and leading are distinguishable occupations, but every great leader is clearly teaching and every great teacher is leading."

The above definitions drive home the fact that leadership is the process of influencing the activities of an individual or a group in efforts towards goal achievement in a given situation. In essence, leadership involved accomplishing goals with and through people Therefore, a leader must be concerned about tasks and human relationship.

Leadership Perspective: Operational Definition

Perspective(U): apparent relation between different aspects of a problem
(Oxford Advanced Learner's Dictionary of Current English)

Perspective also means the ability to think clearly and sensibly about a situation and consider it.

In this light, Leadership Perspective in school situation means able leaders who contour their fellow men to their level and create a school culture. Such leaders, irrespective of odds, rise above the situation and make every effort to see their vision is realised. These principals have a cordial relationship with the people around them. They manage their time well. They balance between their instructional and managerial roles.

In school situation it is the principal who is an academic as well as professional leader for the whole school community. The most significant role of the principals to create an environment or culture in which people are able to identify, formulate and commit themselves to some sort of mission, philosophy and aims. The principal should have a commitment to academic excellence, he should believe that the destiny of a nation is built up in the classroom. He should also develop a culture of learning, principled action and commitment to moral values. With his charismatic personality the principal magnetises the whole institution. It is he who sets the ethical tone through his words and actions. It is a vital factor to give supportive and professionally conducive atmosphere to teacher in order to the obtain the best kind of performance.

If the leadership of the educational institutions is to be effective, then a number of fundamental changes are needed. There must be a systematic and detailed definition of the qualities appropriate to a particular post which recognise the leadership content of role. Secondly, it is necessary to identify the leadership function which permeates all levels of the institution and thus develops a culture of the institution. The practical manifestation of the leadership should be:

- Establishing excellence as the basis for action.
- Building and working through teams.

- Identifying supporting and reinforcing individual talent.
- Managing time.
- Recognising the existence of organisational design to facilitate function.

Thus quality management is reflected in the effectiveness of a school which, in turn, is based on the quality of educational leadership. Leadership is central to the effective management of any institution. It reiterates that quality of leadership as the social determination creating an ethos which allows a school to operate to maximum effort.

In order to enlist the indicators of school effectiveness, a systematic review of related literature was done and a number of indicators of school effectiveness listed as identified by globally renowned researchers. Those indicators were synthesised under the Human Resource Dimensions, namely:

1. Leadership
2. Performance
3. Relationship
4. Organisational Design.

Integrated Approach to Leadership Perspective

1. Leadership

Vision and mission	Sans Soucci (1995)
Setting Goals & High Expectation	
	Scheweitzer (1984)
	Scheerens (1992)
	Rutter (1979)
	Reynolds (1982)
Decision making	
Problem solving	
Creative thinking	
Effective communication	WHO (1997)
Empathy	
Coping with stress	
Coping with emotions	
Integrity	Sans Soucci

2. Relationship

Involvement of teacher	Mortimore(1988)
parents	
students	Rutter, Reynolds

Communication skill	
	Mortmore
Motivating, mobilising	San Souci
Recognition, prize, reward	Heneveld (1994)
Promote accountability	Sans Souci
Create trust	Warren Bennis
Staff development	Scheerens
3. Performance	
Enhance competency/basic skills	Scheweitzer
	Edmonds
Effective instruction	Scheerens
	Edmonds
Effective learning time	Scheerens
Frequent evaluation	
	Scheerens
	Edmonds
	Scheweitzer
	Record Maintenance
	Mort more
4. Organizational Design	
Improve structure	Gray Yukl (1981)
Physical and material facilities	Schereens
Focus on discipline	Heneveld (1994)

Objectives

The following are the objectives of the study.

- To develop a Leadership Perspective model
- To find out the effect of Leadership Perspective on School Effectiveness
- To find out the contribution of Human Resource Management components to School Effectiveness.

Methodology

The method adopted in investigation is causal comparative The steps in the study are—

- To identify anappropriate problem
- Select a defined group and a comparison group
- Collect data on relevant and explanatory and outcome variables and on relevant background characteristics
- Analyse and interpret the data.

1 Identifying the appropriate problem

Previous researches on school effectiveness have identified leadership as one of the characteristics of school effectiveness. But the magnitude of the variable "Leadership Perspective" has not been dealt with The investigator felt that leadership functions as the tap root of the tree of School Effectiveness whereas the other characteristics such as congenial climate, basic skills, periodic assessment etc, work as auxiliary roots. Hence the problem was taken

2. Selecting a defined group and a comparison group

The variables included in the study are Leadership Perspective which is the explanatory variable and the School Effectiveness is the outcome variable.

Need for a Model

There are style theories, trial theories and contingency model for leadership. In the educational area, there is no such model. Hence the investigators felt the need for developing a model on "Leadership Perspective"

Developing a Model

After perusing several related literature on School Effectiveness, Human Resource Management and Leadership, the investigators enlisted a number of characteristics of school effectiveness identified by renowned researchers of several nations. These factors were incorporated into the HRM components namely (1) leadership, (2) relationship, (3) performance, and (4) organisational design and in "Integrated Approach to Leadership Perspective" was arrived at. Then on the basis of these components a model on "Leadership Perspective" was developed highlighting the crucial role of the principal in school effectiveness. This "SAMVEM" model (coined from the first letters of the investigators) envisages that a leader should have a vision and mission that leads to attainable goals. The educational leader has two roles to play i e. Instructional and Managerial. The managerial role has two aspects namely; tasks and relationship. The leader gets the tasks done by the people. The leaders' link with people connected with the organisation is of more value in

the present century because compared to past decades, now the relationship is strained, there is less harmony over the globe So it is a matter of concern. Communication is another factor which influences the performance of a leader An efficient leader gets the tasks done by the people through proper, relevant, adequate, timely communication. Both his instructional role and managerial role are influenced by his personal qualities. All these three aspects, in total, have an impact on performance and Organisational Design and enhance school climate and culture Time Management is crucial for effective leadership. Thus, this "SAMVEM"model, pictures the importance of leadership towards building school effectiveness.

In order to test, the "SAMVEM" model, the investigators selected six primary schools on the basis of interaction with the public, educational officials, parents and also on the basis of academic achievement. Three most effective and three most ineffective (outlier) schools were selected out of the twenty Municipal Primary schools in Pudukkottai, Tamil Nadu According to Whetton and Campbell (1982) comparing two extremes (outlier schools) is one way of establishing effectiveness Hence in the present study three most effective schools were compared with the three most ineffective schools on "Leadership Perspective".

Parents, students and teachers of all the six schools formed the participants. Added to that, the four investigators observed both the schools and their leader by turn, each one spending a week in the school from morning to evening.

Data Collection

Need For Process of Tool Development

There is no standardised tool to assess the School Effectiveness and Leadership Perspective. Hence the investigators pooled the statements on both the variables collected from the principals of primary schools, parents, public and teacher trainees. These statements were fitted into the various dimensions of the "SAMVEM" Then five point rating scale for both the School Effectiveness and Leadership Perspective were constructed. Form I consisted of 17 dimensions with 29 statements and Form II had 12 dimensions with 51 statements. These scales were validated by the experts.

Administering the tools

The two rating scales on Leadership Perspective and School Effectiveness were administered to the students, teachers and parents of the selected six primary schools. The rating scales were also rated by the researchers as well. The investigators took turn to visit all the six schools and each investigator spend one week in each school They observed both the leader and the school and recorded their observation. Thus two types of data are available. One is scores on the rating scales on (1) Leadership Perspective and (2) School Effectiveness. The other is the descriptive statements of the observers.

Data Analysis

As has been pointed out already, two types of data namely quantitative and qualitative are available on Leadership Perspective and School Effectiveness. The rating scales on the above two variables rated by the parents, students and the teachers were collected and were scored.

Rationale for Scoring

In the present study, a comparison of effective schools with ineffective schools is done The quality of Leadership Perspective and School Effectiveness is to be changed in to quantifiable terms. Hence the scoring. The rating scales collected from the students, teachers, parents and the researchers were scored in the following ways.

Highly Agree	Agree	Undecided	Disagree	Highly Disagree
5	4	3	2	1

The scores were tabulated, from the scores obtained on the two variables from parents, teachers and students and were synthesized. Overall average and percentages were computed for each dimension. For facilitating interpretation, the "Leadership Perspective" the 17 dimension of leadership were chunked into five dimension namely:

1. Vision and Mission
2. Performance
3. Organisational Design
4. Relationship
5. Personal Qualities

The twelve dimension of the rating scale (form II) on School Effectiveness chunked into

1. Goals and high expectation
2. Relationship
3. Performance
4. Organisational Design

Percentage of Average Scores of Six Schools on Leadership Perspective

S	Schools	A	B	C	D	E	F
No	Dimensions	%	%	%	%	%	%
1	Vision & Mission	3.2	2.7	3.2	1.8	1.4	1.41
2	Performance	24	21.6	21.5	10.3	9	10.3
3	Relationship	25	22.5	19.5	9.2	12.3	9.2
4	Organisational Design	11.7	11.7	11.6	7	5.5	5.5
5	Personal qualities	22.5	21.2	22.5	12.6	9	10.3
	Total	86.4	79.7	78.7	40.9	40.5	39

Interpretation

Leaders of Effective Schools A and B are the same as far as the dimension vision and mission is concerned. The principal of the school A secures the highest in Performance and Relationship dimensions. All the three effective schools are alike in Organisational Design. Regarding personal qualities, the principals of schools A and C secure the same percentage of scores. It is to be noted that all the ineffective school leaders have scored low in all the five dimensions

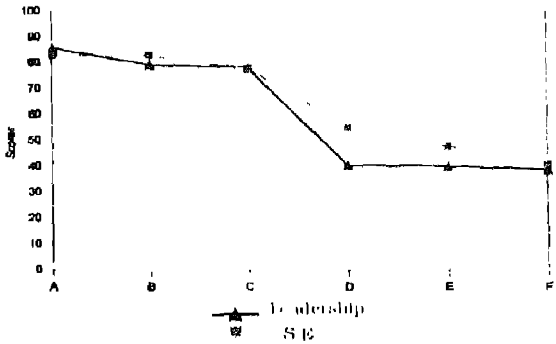
Percentages of the Average Scores of Six School in School Effectiveness

S	Schools	A	B	C	D	E	F
No	Dimensions	%	%	%	%	%	%
1	Vision & Mission	7	6	6	3.6	3.4	3.4
2	Performance	48.3	49.7	47	33.3	29.7	23
3	Relationship	16.2	16.2	14.9	10.9	9.3	9.3
4	Organisational Design	12	11.5	10.5	7.7	5.8	5.4
	Total	83.5	83.4	78.4	55.5	48.2	41.1

Interpretation

The table shows the effective schools A, B and C have high percentage of scores in all the four dimensions of "SAMVEM" Model The three ineffective schools D E F have scored low in the three dimensions except performance. There is consistency in the scores in which reveals that the parents, teachers and the students perceptions are reflected appropriately and adequately through their consistent scoring, on the various dimensions.

Leadership and School Effectiveness



Interpretation

The figure proves that there is positive relationship between Leadership Perspective and School Effectiveness The Leadership Perspective for the ineffective schools D,E & F is low, but there is slight variation in the School Effectiveness The reasons might be, other characteristics of school Effectiveness might have acted upon.

A Comparative Analysis of the Leadership Perspective on School Effectiveness

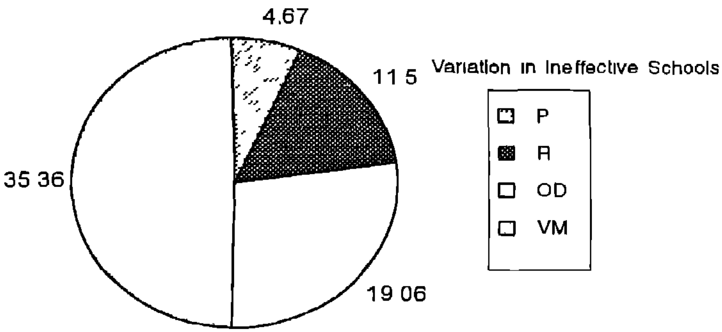
Dimensions	Leadership Perspective			School Effectiveness		
	ES %	IS%	Variation %	ES %	IS %	Variation
Vision & Mission	3	1.53	1 47	6.33	3.47	2.86
Performance	22.38	11.96	10.42	48.33	28.68	19.65
Relationship	22 33	10.23	12 1	15 78	9.83	5.95
Organisational Design	11.68	6	5.68	11.33	6 33	5.00

A comparative analysis of the Leadership Perspective and School Effectiveness is done. Among the various dimensions of Leadership Perspective, the percentage of variation between effective and ineffective schools is maximum with respect to the "relationship" and "performance" The same is reflected in sehool effectiveness also. There is less variation in the dimension" Vision and mission" among the leaders of effective and ineffective schools. This proves that their vision is realised only through performance and relationship i.e., it is explicit in their action.

Regarding organisational Design there is not much variation between effective schools and ineffective schools because at primary level the heads do not have much say in the organisation.

Contribution of HRM to

School Effectiveness

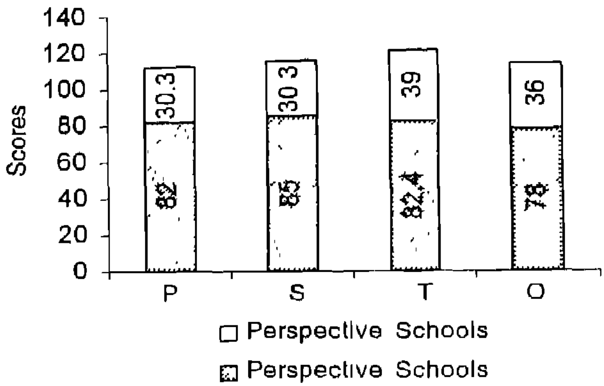


Interpretation

Figure explains that in Effective Schools the contribution of the components of Human Resource Management to overall Effectiveness is.

Vision & Mission	4.67%
Organisational Design	11 5%
Relationship	19 03%
Performance	35.36%

Consistency of Scores in Leadership



P= Parents S= Students, T= Teachers , O= Observers

Interpretation

The figure shows the consistency of scores in leadership perspective In the present study, teachers, parents and students are linked with the functions of the leader. Their rating is corroborated with the ratings of the non-participant observers, i.e. investigators.

Qualitative Analysis - Observations of the Observers

Variables	A	B	C	D	E	F
Leadership	Very dynamic Sincere & sets a role model to others Problem solving capacity encourages staff	Provides good instructional leadership visit classrooms frequently Disciplinarian Good in Communication support from the staff	Committed to high achievement builds up cordial relationship with people around. Copes with stress & emotion.	Low motivation Low communicative skill. No frequent evaluation monitoring involvement of community low	Low vision no problem solving capacity not manages disruptive behaviour involvement of community low	No positive mental attitude No decision making Non involvement of teachers involvement of community low

Variables	A	B	C	D	E	F
School Effectiveness	Teachers are highly involved in instruction Students are grouped according to their abilities. TLM are used feed back to students	Students spend most of the time in learning Emphasis on basic skills Frequent evaluation cogenial environment feedback to students	Records are well maintained focus on order and discipline Monitoring system. Feed back to students.	TLM not much used Time on task less Poor Instruction No frequent evaluation	Teachers are unwilling to assume responsibility Time on task less Poor instruction No frequent evalaution No frequent evaluation	No focus on discipline Time on task less Poor Instruction

Discussion

This study confirms the finding of Gray (1990) that the head teacher to be the key agent in bringing about change in many of the factors affecting School Effectiveness. Louis & Miles' (1992c) have pointed out the role of leadership in initiating and maintaining the school improvement process which is reaffirmed by the present study. This study is in consonance with the Louis & Miles'(1990) finding that the successful leaders will establish and sustain regular contacts with networks

This investigation corraborates with the findings of Bosset, Dwyer, Roman & Lee (1982), Greenfield (1982) and Cohen (1982) that principal's orientation is especially important for effective schools.

Findings

Combining the principles of Human Resource Management, Leadership and School Effectiveness, Leadership perspective Model — "SAMVEM MODEL" was developed. This explains that the functions of the principals is to generate criteria for effectiveness.

Among the various dimensions of HRM, there is much variance between the leaders of effective and ineffective schools in the conmponents of "relationship and performance"

In effective schools the contribution of the components of HRM to overall effectiveness is

Vision and Mission	4.67%
Relationship	19.03%
Performance	35.36%
Organisational Design	11.5%

Implications

By providing a supportive and professionally conducive environment that models high expectations with a strong sense of efficacy, an efficient and dynamic leader could realise his vision. He should see that there is a balance between interpersonal relationship and achieving task. With the emphasis on HRM components, there is possibility of training individuals in enhancing leadership qualities.

- Selection for the principal post should be made only on the basis of merit To enlarge one's vision, one should undergo personality development course. This broadens his horizon, goals and vision. It also enhances his personal qualities.
- With rich experience as a teacher, a principal would shine as an instructor But prospective principals should undergo rigorous training for managerial role atleast for three months. There he identifies the tasks that are to be performed by him One of the findings of the study indicates that there is much variance between effective and ineffective leaders in the dimension performance, So orientation should be given to enhance performance.
- The finding of the study throws light on the need for better relationship, it is advisable to conduct workshops and seminars on behavioural science for the principals.
- Seminars could be arranged on Time Management and Effective Communication.
- Above all these, he should take internship under an efficient principal in a most effective school. Because all human beings are not creative. They could atleast replicate what others have done. Thus if Principals are given special training in management and personality development, days are not far off, when most primary and secondary schools would be led under the able guidance of efficient leaderships, which invariably would result in effective schooling

Efficient Leadership leads to effective schooling which in turn results in —

- Decrease in drop-outs
- Increase in retention
- Universal enrolment
- Enhancing the quality of primary eduction
- Enabling us to realise the goals of Universalisation of Primary Education, and
- Education for all.m

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